ELECTRICAL WEST

January 1950
25 cents

Whose Water Is It?, Page 53
Appliances, Page 76

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

who knows?

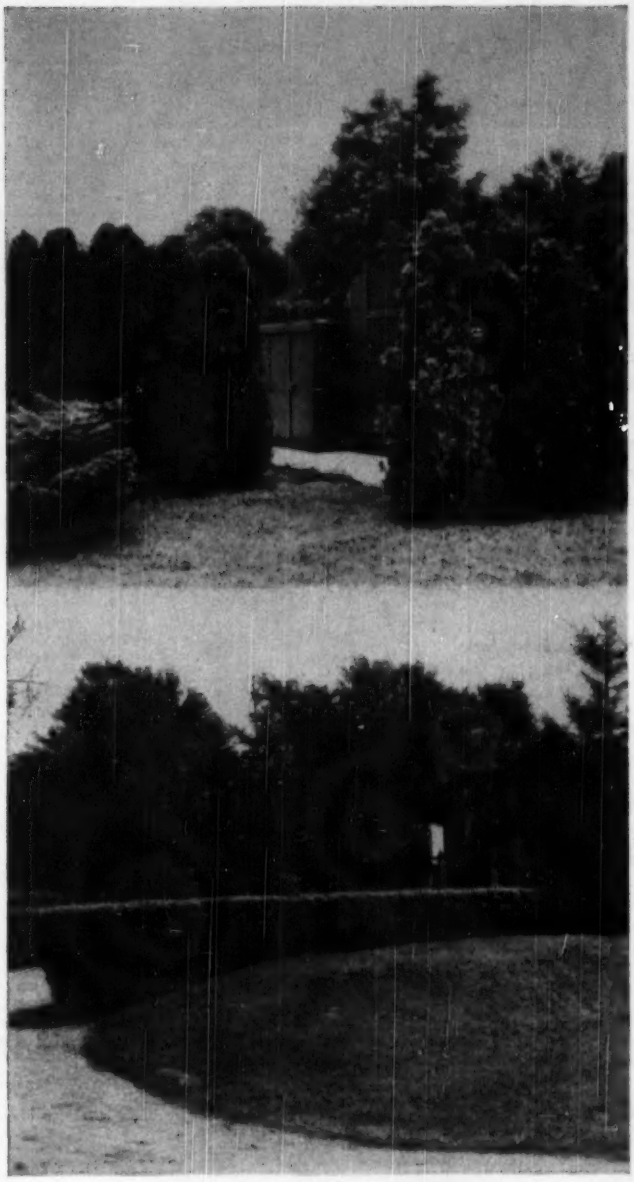
Suppose you stood some appliances around in your store, put a "For Sale" sign on each, and then called it a day. What would happen? Probably nothing. Except to dust them off occasionally, you'd never have to lift a finger — and you wouldn't be in business very long.

You'd be a little better off if you moved a few appliances into your window or out onto the sidewalk. Passers-by at least would see that you had something to sell, even if they didn't know what it was.

Which illustrates a point: The more people know about what you're selling, the better your chances of selling it become.

It illustrates, too, why Edison advertising is important to every appliance dealer. Electrical appliances are ways to better living—and for more than half a century, Edison advertisements have done their best to see that everybody knows it!

Southern California Edison Company



THE PROBLEM OF
SUBSTATION APPEARANCE
IN RESIDENTIAL AREAS IS
EASILY OVERCOME WHEN YOU
INSTALL GENERAL ELECTRIC
UNIT SUBSTATIONS . . . .
THEIR INTEGRATED DESIGN
MAKES THEM EASY TO LANDSCAPE
AND THUS OVERCOME
APPEARANCE OBJECTIONS.
ASK YOUR G-E REPRESENTATIVE
FOR BROCHURE GEA-5155
THAT SHOWS HOW OTHER
UTILITIES TOOK ADVANTAGE OF
G-E ENGINEERING AND SERVICE
(TWO EXAMPLES AT LEFT).
OR WRITE TO . . . .
APPARATUS DEPARTMENT
GENERAL ELECTRIC COMPANY
SCHENECTADY 5, NEW YORK

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

JANUARY 1950

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-second year of publication

ELECTRICAL WEST

James H. McGraw (1860-1948), Founder
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W. A. Orr, Associate Editor — Walter C. Huston, Engineering Editor
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Facts, Figures and Plans

The February issue, as customary, will be devoted almost entirely to a review of the activities and accomplishments of the utilities during the past year (1949), and a preview of plans for 1950. Actual expenditures for new construction in 1949 will be reported. Figures will show the actual cutback during the "recession" year of '49. This, we already know, was only a few per cent here in the West. Budgets for 1950, on the other hand, will show what is ahead. Again, the editors know that the outlook for utility spending during 1950 will continue at about the same level as actual expenditures during 1949—but, study the figures and report of each utility as presented next month.

The usual national statistics for the industry as a whole likewise will be reported. The Calendar of New Generation for the West has created interest. It will be revised with the latest figures.

Sales and load-building activities of utilities for the past year, including kwh. per customer and other indices, will be covered. Outlook and plans for 1950, also will be presented. While the figures are supplied by utilities, they measure the accomplishment and opportunity of all the industry.

All of the foregoing is in addition to our usual complete coverage of news events, people, assocations, trade notes and the two News Letters.

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Cover photo: **Radio Ski Patrol**, Photo by R. L. Brinton

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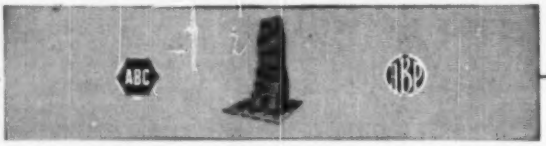
San Francisco (4) ... Tom Carmody, 68 Post St., DO. 2-4600



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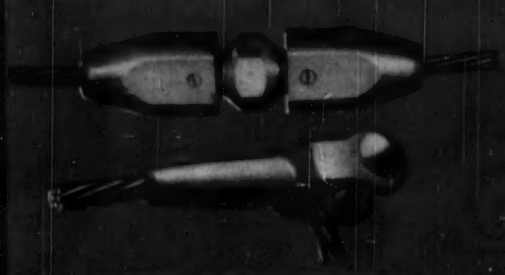


L-M FARGO MESSENGER SPLICES AND DEAD ENDS

Both splice and dead end are available in choice of nut type, like the splice shown, for tightening on the ground, or in fully automatic, shown by the dead end, in which a slight cable tension sets the cones automatically. High strength bronze shell, cones, and lock screws. For Copperweld to ¾".

OTHER L-M HARDWARE FOR AERIAL CABLE

L-M provides many useful items, such as the double upset extension bolt, which holds messenger clamps with adequate pole clearance; and the double suspension hanger, which supports messenger during stringing, and grips it permanently after bolts are tightened. Steel, with all parts hot dip galvanized.

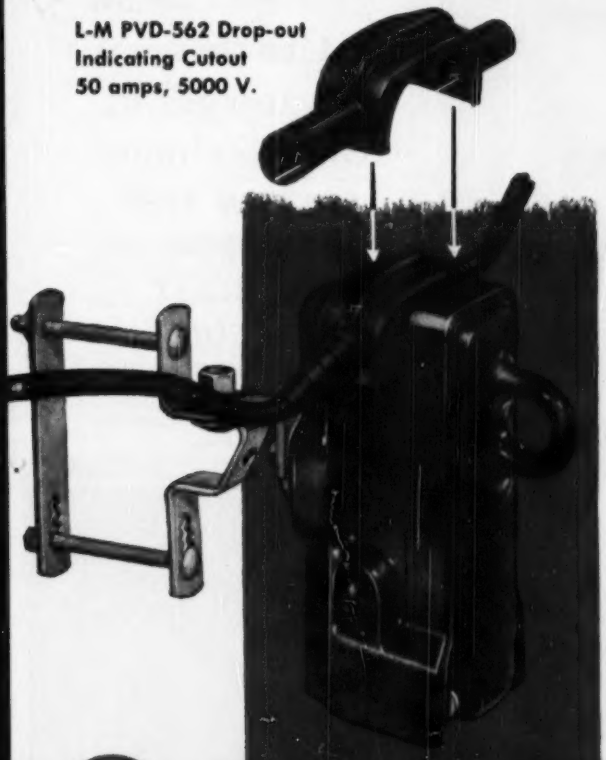
Free!

THIS HANDY GUIDE

Illustrates and describes types of cable, stringing methods, materials, typical installations; 32 pp, indexed. Ask the L-M Field Engineer or write Aerial Cable Materials Division, Line Material Co., Milwaukee 1, Wisconsin.

aerial cable... easy to use with L-M aerial cable materials

L-M PVD-562 Drop-out Indicating Cutout 50 amps, 5000 V.



No "Johnny-come-lately" is L-M in this aerial cable materials business. For years L-M men have worked right alongside of designers, erectors, and users, to test and develop materials that would help simplify the stringing of self-supporting aerial cable, and would help the user enjoy the maximum in service and long life.

In L-M's hardware department, the extensive line of aerial cable materials rates a special division. A few items are shown on this page; many more are described in the bulletin mentioned above. And of course many of L-M's regular hardware and specialty items find application in aerial cable installations.

Discuss your aerial cable problem with the L-M Field Engineer who may give you valuable suggestions; or write Aerial Cable Materials Division, Line Material Company, Milwaukee 1, Wisconsin.

New! L-M aerial cable fuse cutout

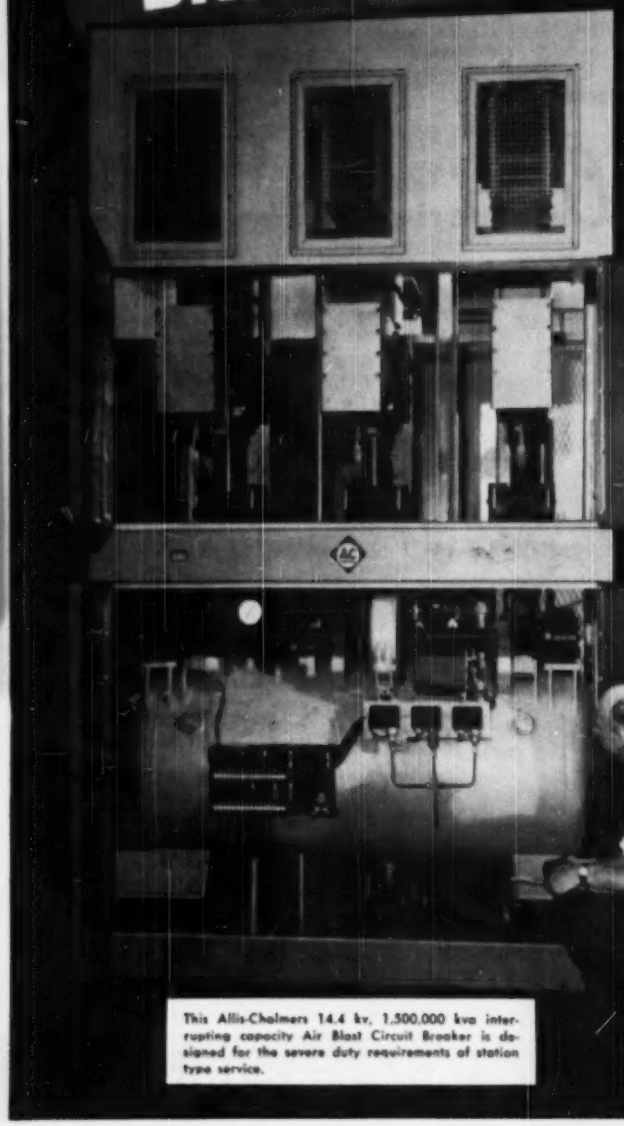
The first drop-out cutout designed specially for aerial cable. Same indicating and operating features as the famous L-M PVD-56. But here the conductor runs right through a slot in the top.

You don't cut the cable. Just skin it and drop it into the slot. A copper-jawed clamp grips it firmly without deforming the conductor. The flexible synthetic hood waterproofs the top of the box and protects cut ends of the insulation. Ears of the hood are wrapped around the cable and taped. Makes a neat, fast installation.

LINE MATERIAL...Pole Line Hardware

Complete Coordinated Equipment for All Distribution Requirements 7125

AIR BLAST CIRCUIT BREAKERS



Get these Advantages in Allis-Chalmers *STATION TYPE INDOOR AIR BLAST CIRCUIT BREAKER*

This Allis-Chalmers 14.4 kv, 1,500,000 kva interrupting capacity Air Blast Circuit Breaker is designed for the severe duty requirements of station type service.

Greater Safety-Low Maintenance

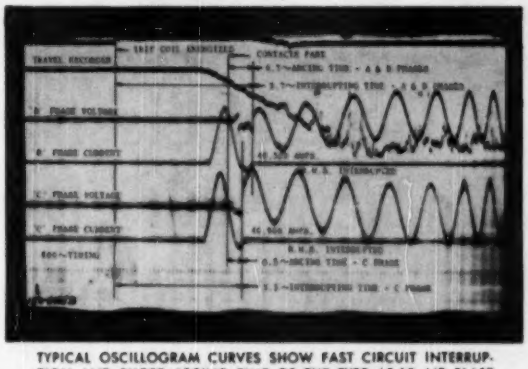
RATINGS AND PERFORMANCE FULLY PROVED by 3 phase interrupting capacity tests.

ACTUAL INTERRUPTING TIME LESS THAN 5 CYCLES . . . minimizes system disturbances, eases strain on connected equipment.

ARCING TIME ONE CYCLE OR LESS! Prestored compressed air *blasts* out arc for fast interruption.

SAFE DEPENDABLE OPERATION. Breaker is completely enclosed within grounded steel housing. Operation is electrically and pneumatically trip free.

LOW COST MAINTENANCE. Negligible contact burning because of low arcing time. Entire breaker is accessible through hinged doors.



TYPICAL OSCILLOGRAM CURVES SHOW FAST CIRCUIT INTERRUPTION AND SHORT ARCING TIME OF THE TYPE AB-15 AIR BLAST CIRCUIT BREAKER

FULLY PROVED, modern Allis-Chalmers Air Blast Circuit Breakers can be supplied in 14.4 kv ratings, up to 2,500,000 kva interrupting capacity, in accordance with the new ASA standards.

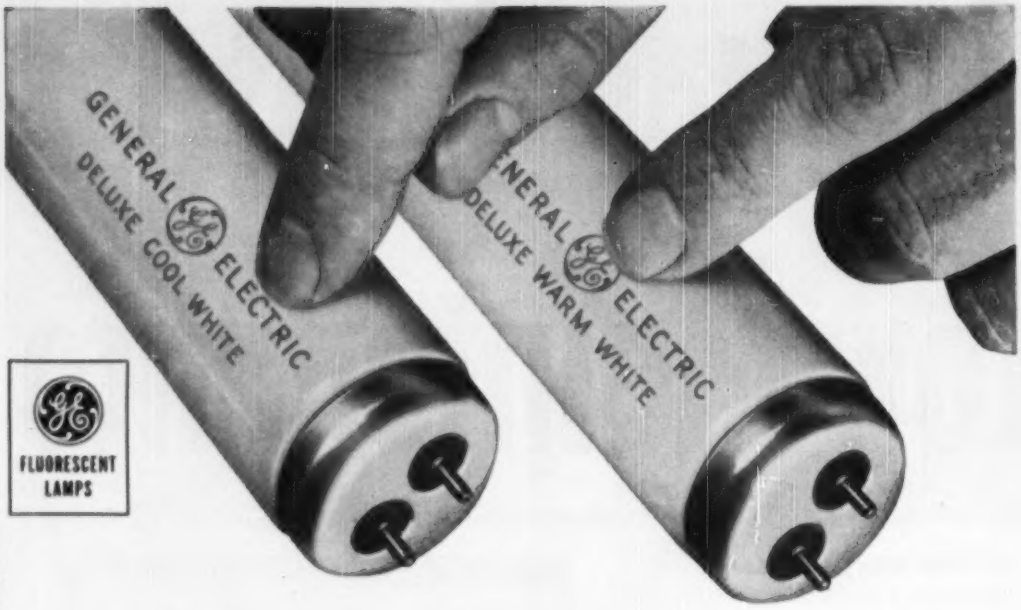
Allis-Chalmers air blast breakers are factory assembled complete with cubicle, necessary control equipment and breaker air storage tank, ready to install and operate.

For more information on the advantages of this modern, oil-less air blast power circuit breaker, contact your nearby A-C sales office. Or write direct.

A-2794

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS



General Electric announces two new white fluorescent lamps that bring out all colors!

NOW for the first time, you can have fluorescent lighting that gives near-perfect color rendition! The secret is a revolutionary new phosphor, "D-R", which, added to the inside coating of two new General Electric fluorescent lamps, transforms the effect of the white light they give. The new lamps—1) DELUXE *COOL* WHITE and 2) DELUXE *WARM* WHITE—show colors better than fluorescent ever could before, and at the same time offer you a choice of *cool* atmosphere or *warm*.

It's the greatest advance in fluorescent since G.E. introduced the first fluorescent lamp in 1938. And they'll give fluorescent lighting sales a big boost. These two new lamps will be available soon in 40-watt size, later in other standard sizes.

NEW WHITE LAMP LINE MAKES SELECTION EASY!

The whole question of *which* "white fluorescent lamp" to use is now simplified. The two new lamps—plus two "high-efficiency" lamps—create a line of four G-E white fluorescent lamps that fill practically every fluorescent lighting need.

STANDARD COOL WHITE (formerly 4500 white)—offers high efficiency with reasonable color rendition. Widely preferred for most working and selling areas.

DELUXE COOL WHITE—gives best possible color rendition with good (but not highest) efficiency. Recommended for areas where color rendition is most important.

STANDARD WARM WHITE (formerly Warm Tint) provides highest efficiency combined with color impression of filament lighting.

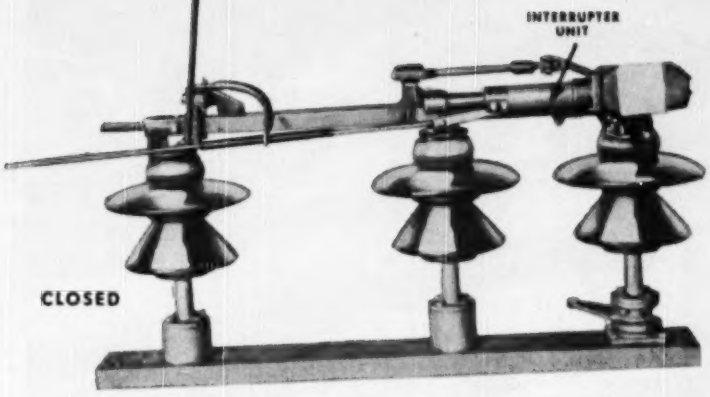
DELUXE WARM WHITE combines excellent color rendition with good (but not highest) efficiency. For warm environment where true color is essential.

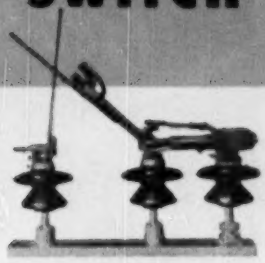
FREE SELECTOR GUIDE shows which lamps you need to meet your lighting requirements. Write General Electric, Div. 166-EW1, Nela Park, Cleveland 12, Ohio.

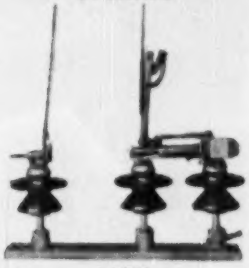
You can put your confidence in—

GENERAL ELECTRIC

GET 3E THE MOST WITH A AIR INTERRUPTER SWITCH







The Opening Cycle of the 8400-I Air Interrupter Switch

Three E Air Interrupter switches can successfully perform many high voltage switching operations not possible with disconnects or horn gap switches. Furthermore many operations for which expensive oil circuit breakers are being used can be entrusted to these new types.

Load, charging, and magnetizing currents can be interrupted at varying capacities up to 69,000 volts.

A unique high speed interrupter unit, illustrated above, is added to our standard air break switches making these operations possible.

Arc created by the interruption is confined and extinguished inside the arcing chamber of the interrupter unit. There is no burning or pitting of contacts.

INTERRUPTER UNIT

When you specify high voltage switches, why not specify Three E Air Interrupter Switches and get all these extras?

Write for our new Bulletin 331 and get the complete story on these highly efficient switches.

Air Interrupter Switches are also built as the 8900-IU type in the tilting insulator design with three insulator stacks per pole.

THREE E ELECTRICAL ENGINEERS EQUIPMENT CO.

MELROSE PARK, ILLINOIS

Get CORRECT CONDUIT CONNECTIONS

The easy economical way

Cross Section Showing Indentations

• NEATER • STRONGER • FASTER • APPROVED

All B-M Fittings Carry the Underwriter's Seal of Approval and Canadian Standards Ass'n Approval No. 9296

Select the best, insist on Briegel All Steel Fittings, the original approved Indenter type connectors and couplings for thin wall conduit tubing. You will not only find that Briegel Indenter Fittings are easier and faster to use, but also make neater, stronger connections, the correct connections. Two Easy Squeezes and they're set. Start using Briegel Fittings today. Have more satisfied customers—more profits from each job.

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BRIEGEL METHOD TOOL CO.

GALVA, • ILLINOIS

Only the BEST pass these tests

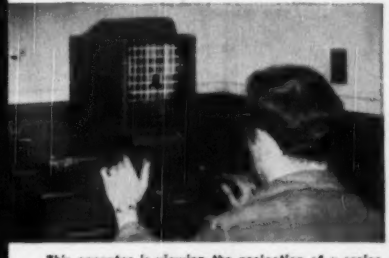
The spectrograph provides one of the most efficient means for precise metallurgical control. Samples taken from a heat in the Driver-Harris melting furnaces are analyzed so rapidly by means of this apparatus, that a complete analysis can be obtained before the next heat is ready for pouring. Thus any necessary adjustments can be made immediately—an outstanding advantage in controlling the constituent elements of alloys being produced to extremely close specifications. The operator is here seen adjusting the size of the analytical gap in the arc-spark stand of the Driver-Harris grating spectrograph at the start of an exposure.

The quality of any manufactured item depends upon a number of factors, but on none so much as "inspection". And here, at Driver-Harris, we give top priority to inspection.

Through every stage of manufacture, precise metallurgical checks and controls are systematically applied to D-H Alloys to insure quality and uniformity that are unsurpassed—recognized the world over.

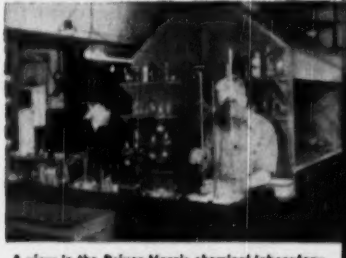
We have had 50 years' experience in continuous alloy research and manufacture. Every piece of D-H wire, ribbon or strip, and every casting embodies advantages such as only half a century of accumulated know-how can provide.

Whatever your requirements for electrical resistance and heat-resisting alloys, send us your specifications. We shall be glad to make recommendations, and supply you with the alloy best suited to your needs.



This operator is viewing the projection of a series of spectrograms, and is about to measure the intensity of specific spectral lines to determine the quantity of certain chemical elements in the samples being analyzed.

The research metallograph, the ultimate in metallurgical microscopes, is applied to both research and quality control at Driver-Harris.



A view in the Driver-Harris chemical laboratory —fully equipped for all standard types of volumetric, gravimetric and colorimetric analyses.

FIFTIETH ANNIVERSARY

*Makers of over 80 alloys for the electronic, electrical and heat-treating fields—including world-famous Nichrome**

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1114 Valencia St., San Francisco 449 So. San Pedro St., Los Angeles

Main Office and Plant: HARRISON, NEW JERSEY

*T. M. Reg. U. S. Pat. Off.

YOU CAN BE SURE.. IF IT'S
Westinghouse

PROOF
FROM
CALIFORNIA

"500 transformer years of service convince us 'CSP' is better"

The record is clear and complete in this case history of the way "CSP"* transformers practically eliminated outages for twelve years.

The facts are these:

In 1932, the utility built a line to a neighboring town some 40 miles distant, using conventional-type transformers. The next four years were plagued with service calls to this line because of both lightning and overload outages.

In 1936, two "CSP" transformers were installed in an effort to find a way to halt the mounting service costs. So successful were these two installations that additional "CSP" units have been added each year, until now over 500 transformer years of service, with only one transformer failure, have proved the worth of Westinghouse "Completely Self-Protecting" transformers.

This much is sure: The *built-in* protection of "CSP" transformers reduces outages on both lightning and overload. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70537

*Trademark—Reg. U. S. Pat. Off.

WANT MORE FACTS? Here are 36 pages of product information you'll want to have about Completely Self-Protecting transformers. Covers construction, operation, mounting and servicing. Ask for B-4249.

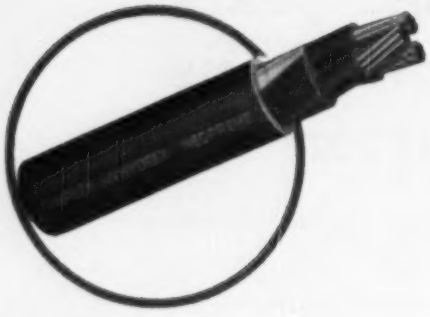
Call the Westinghouse Salesman

Westinghouse "CSP" TRANSFORMERS

Made in the WEST.. for the WEST

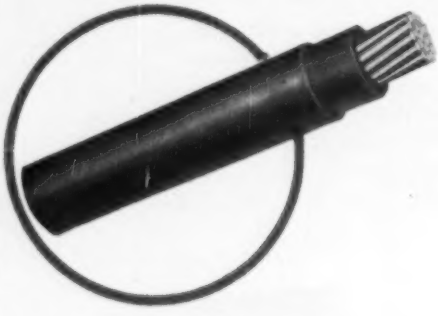
SIMPLEX PRESENTS..

3 ways to [CUT WIRING COST INCREASE WIRING EFFICIENCY]



Simplex-Anhydrex Cables...

Can be buried directly in earth, installed in ducts and conduit or run through open air. Anhydrex insulation provides sound electrical properties plus unusual stability in the presence of water and moisture. A tough neoprene jacket assures protection against abrasion, soil acids and alkalies, oils, heat, flame and sunlight. Not subject to electrolysis and corrosion, easy to install, splice and terminate. Ideal for industrial power lines, street, park and airport lighting, series lighting circuits, and for underground service entrance. Write for catalog 985-A



Simplex-Anhydroprene Cables...

Consist only of a coated copper conductor, Anhydrex insulation, and a thin wall of neoprene. Are light in weight and small in diameter. Can be used in open air or raceways in buildings, in conduit, or underground in ducts. Recommended for plant and shop wiring, signal and control circuits, instrument wiring, and for use as Type RW Building Wire. Write for Bulletin 115.

Simplex-Tirex Portable Cords and Cables...

Feature the toughness, flexibility, and electrical stability that mean trouble-free performance under all service conditions. Protected by Selenium Neoprene Armor, the cured-in-lead jacket that assures balanced resistance to rough handling, oil, grease, chemicals, sunlight, heat and flame. Sizes and types available for all portable equipment from hand tools, welding machines and lighting units to heavy shovels and cranes. For a description of the "plus values" they provide. Write for Folder 993.

SIMPLEX WIRES & CABLES

SIMPLEX WIRE & CABLE CO., 79 SIDNEY ST., CAMBRIDGE 39, MASS.

A completely rebuilt motor is tested with dynamometer. This machine applies low voltage and overloads exactly as in actual usage.

Complete Facilities

KEEP ELECTRIC MOTORS ON THE JOB

California Electric Works, San Diego, features modern equipment, large stock of parts, 2 shift operation, 24 hour service in emergencies to give top-flight Allis-Chalmers Certified Service

IN SAN DIEGO, and *every* major industrial center in the United States you will find an outstanding, independent Allis-Chalmers Certified Service shop.

These shops have been carefully picked for their experience, highly skilled workmen, modern equipment and business reputation. Each uses nothing but factory approved methods and parts.

So when you need service on electrical equipment, call the nearest Allis-Chalmers Certified Service shop. You can be sure of fine workmanship, fast service and fair prices.

GOOD SOURCE FOR NEW MOTORS, TOO

Your Allis-Chalmers Certified Service Shop or Authorized Dealer can give you the same fast, dependable delivery on new motors. Whichever you need, new motors or service on your present equipment, you can depend on your Allis-Chalmers Certified Service shop. A-2883

ALLIS-CHALMERS, 939A SO. 70 ST. MILWAUKEE, WIS.

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and Sales Offices throughout the country.

CONTROL — Manual, magnetic and combination starters; push button stations and components for complete control systems.

TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

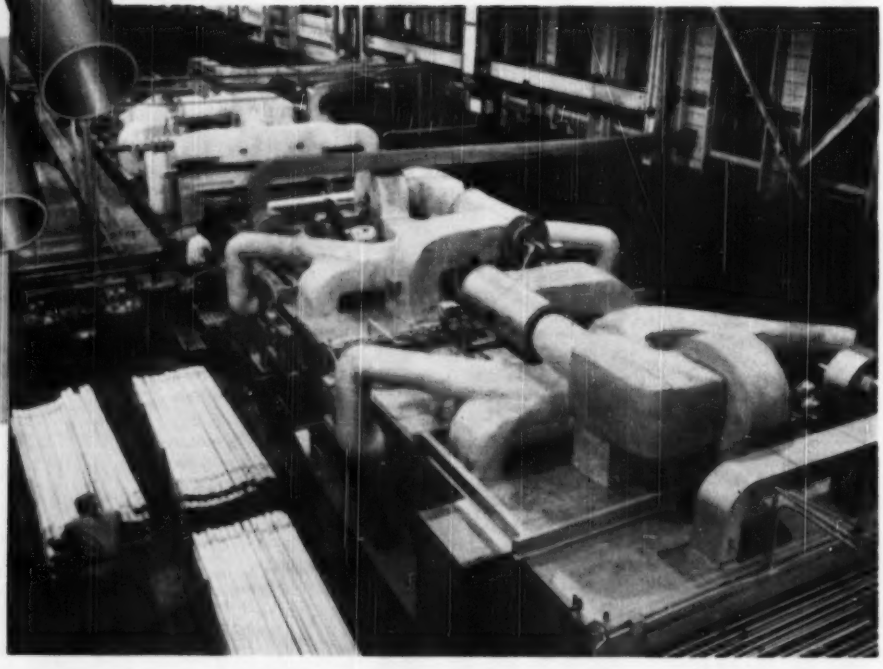
PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

Texrope and *Vari-Pitch* are Allis-Chalmers trademarks

ALLIS-CHALMERS

Announcing

Rome • EMT is immediately available in ½", ¾", 1", 1¼", 1½", and 2" from Rome Cable warehouse stocks as follows: Torrance, Calif. Los Angeles, Calif. • Denver, Colo. San Francisco, Calif. • Dallas, Tex. Salt Lake City, Utah • Seattle, Wash.



Rome • EMT

THE *BETTER* ELECTRIC METALLIC TUBING

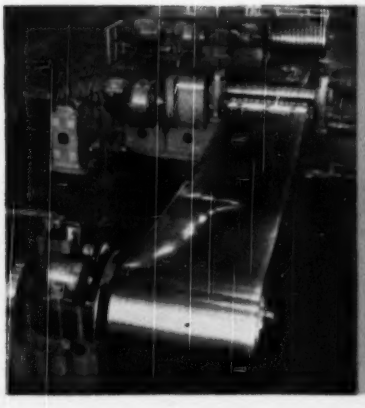
Light in weight, easy to bend, economical to use . . . it is the preferred EMT in the West.

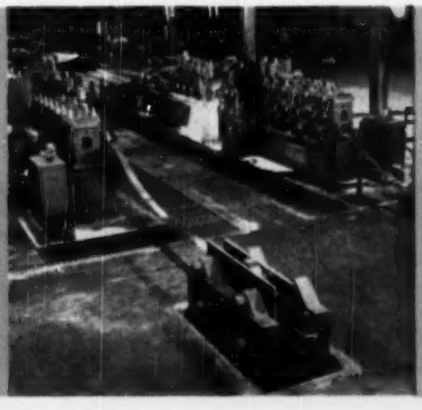
• Rome Cable Corporation Now Goes West to Serve You More Completely.— With the acquisition of the property and manufacturing facilities of Andersen-Carlson Manufacturing Company, Torrance, California, Rome Cable supplements its high quality wires and cables with a full line of electric metallic tubing.

With more than a year of production and distribution behind it, Rome • EMT* is already the preferred light wall conduit in the West. Accurately made in a plant with the most modern equipment (see photos below) Rome • EMT measures up to Rome Cable's already recognized high standards of workmanship in every respect. Electro-galvanized, the exterior is uniformly zinc coated for maximum resistance to corrosion, while the inside finished with clear enamel is mirror smooth for easy pulling. Users of the Rome • EMT have acclaimed its superior quality. It is, of course, Underwriters' approved and complies with all standards for thin wall raceway. Skilled workmanship and modern facilities make Rome • EMT your best buy.

**Formerly sold under the name of Andersen-Carlson Manufacturing Company*

It Costs Less to Buy the Best . . . Buy Rome • EMT





For unexcelled cable performance:

RoZone
RoMarine
RoPrene
RoLene
RoFlex
RoBarn
Rome Synthinel®

Remember these names for dependable quality.

- *Left:* Discharge end of electro-galvanizing and enameling unit
- *Above:* Equipment for slitting steel to accurate width from jumbo roll
- *Above Right:* Of advanced design, these units form and automatically weld the tubing

ROME CABLE
Corporation
TORRANCE, CALIFORNIA

PACIFIC COAST SALES OFFICES

SALT LAKE CITY 1, UTAH
230 South 4th West St.

LOS ANGELES 21, CALIF.
2036 Bay Street

SAN FRANCISCO 3, CALIF.
1045 Bryant Street

SEATTLE 4, WASH.
3404 Fourth Ave., So.

The Pacific Electric Mfg. Corporation

announces
the availability of

TYPE RHE OIL CIRCUIT BREAKERS

3-cycle interrupting time
20- to 50-cycle field-adjustable reclosing time

Kv	Amp to	Interrupting Kva to
115	1200	5,000,000
138	1200	5,000,000
161	1200	7,500,000
196/230	1200	10,000,000
230	1200	10,000,000

Deliveries have now started in the 230-kv ratings of which orders for eighteen 3-pole units are now in process of manufacture.

These circuit breakers embody in advanced form the design elements of the prototype RHE circuit breakers which at the Grand Coulee Tests of June 1948 easily interrupted the entire available short-circuit capacity: 9,600,000 kva at 242 kv, ASA 3-phase basis—said to be the largest fault ever interrupted.

PACIFIC ELECTRIC MFG. CORPORATION
San Francisco 24, California

when you don't need indication
THIS IS THE CUTOUT TO USE—

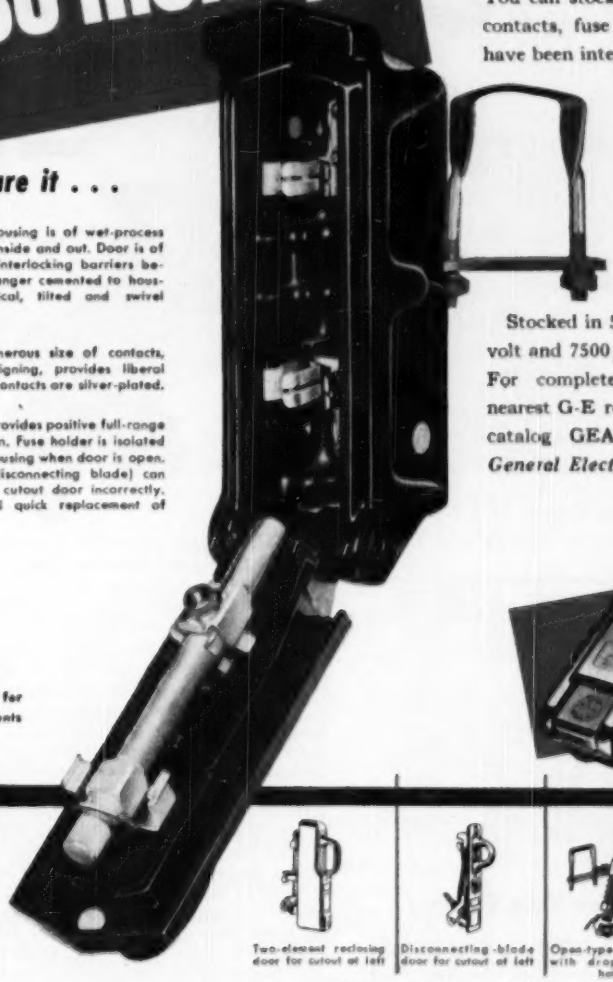
It saves you money!

Compare it . . .

MECHANICALLY—Housing is of wet-process porcelain glazed inside and out. Door is of Textolite. Double interlocking barriers between contacts. Hanger cemented to housing permits vertical, tilted and swivel positioning.

ELECTRICALLY—Generous size of contacts, which are self-aligning, provides liberal contact area. All contacts are silver-plated.

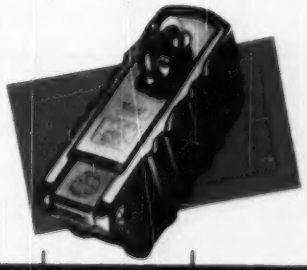
FUNCTIONALLY—Provides positive full-range current interruption. Fuse holder is isolated from contacts in housing when door is open. Fuse holder (or disconnecting blade) can not be placed in cutout door incorrectly. Enables easy and quick replacement of blown fuse.



This G-E non-indicating fuse cutout is the lowest in price of all wet-process-porcelain enclosed types. It costs less to maintain—with practically no moving parts. It is the sturdiest cutout built. You can stock fewer replacements—all contacts, fuse holders and other parts have been interchangeable for 21 years.

Backed up by an unexcelled operating record of performance efficiency, and durability, this cutout is the most reliable and economical type you can buy.

Stocked in 50- and 100-ampere, 5000-volt and 7500/12,500-volt Gr. Y ratings. For complete information, see your nearest G-E representative or write for catalog GEA-2390. *Apparatus Dept., General Electric, Schenectady 5, N. Y.*



Primary Fuse Cutouts for All Service Requirements

Enclosed indicating and drop-out fuse cutout

Two-element reclosing door for cutout at left

Disconnecting-blade door for cutout at left

Open-type fuse cutout with drop-out fuse holder

Flip-open fuse cutout

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

NEW BY

SERIES 5200

SERIES 5200 STRAIN CLAMPS

CATALOG NUMBER	MAX. CABLE DIA.	FITTING	ULTIMATE STRENGTH
5200 5210	.55"	Socket Clevis	10,000
5201 5211	.68"	Socket Clevis	15,000
5202 5212	.84"	Socket Clevis	20,000
5203 5213	.96"	Socket Clevis	30,000
5204 5214	1.10"	Socket Clevis	30,000
5205 5215	1.28"	Socket Clevis	35,000

Send For New Catalog

BTC's new catalog of Drop-Forged Hi Line Hardware will soon be coming off the press. It's chockful of information you'll want to have on hand—pictures, blueprints and complete specifications on Brewer-Titchener's entire line of Drop Forged Steel, Aluminum and Bronze Hi-Line Hardware. Write today.

THE largest manufacturer of Drop-Forged Steel Transmission Line Conductor Clamps and Fittings, after a thorough investigation of materials, development of production techniques, and installation of new, modern, and efficient manufacturing facilities, now offers a complete new line of Minimum-Power-Loss (M.P.L.) Suspension and Strain Clamps for use on A.C.S.R. and all-aluminum conductors.

On high-current transmission lines, the use of magnetic ferrous clamps, completely enclosing the conductor, causes considerable hysteresis and eddy current power losses. The conductor heating and annealing effects of such clamps has been the current-limiting factor on some transmission systems.

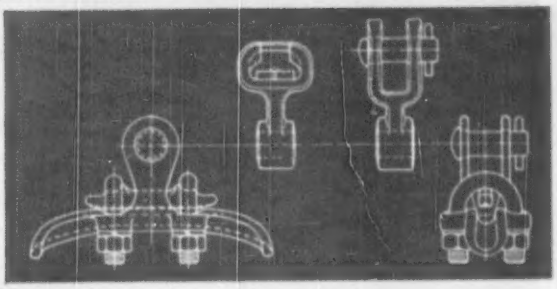
In the clamps listed here, the magnetic path around the conductor is effectively broken by the use of non-magetic clamp bodies, and power losses, even on heavily loaded lines are negligible—the temperature of the conductor in the clamped section may well be lower than that in the span, due to the greater radiation surface of the clamp assembly.

The general design closely follows that of the time-tested B.T.C. Drop-Forged Steel Clamps, retaining all of their desirable features—Reduction of the effects of conductor vibration by light weight, short connecting length, and smooth die-forged clamp seats with

DROP-FORGED ALUMINUM M-P-L * CLAMPS

BTC

* *Minimum-Power-Loss*



SERIES 9500

ample cable-supporting length and large snubbing radii —Bell-mouthed corona-free large-radius beaded ends.

A wide range of sizes makes possible the selection of exactly the right clamp to fit properly the conductor.

The Suspension and Strain Clamp bodies are Drop-Forged from high strength Aluminum Alloy and are heat-treated, with all of the desirable physical properties of parts produced by these processes—superior strength and resistance to shock and fatigue without excessive mass and weight—uniformity and refinement of internal structure—lasting reliability in service —close dimensional fidelity—excellent finish and appearance.

Clamping Keepers and fully machined Connectors are Drop-Forged Steel.

Connecting Pins, Clamping Bolts, Nuts and Lock Washers are steel.

All ferrous parts are hot-dip galvanized.

Rated ultimate strengths are more than adequate for use on conductor sizes accommodated.

Further information on request.

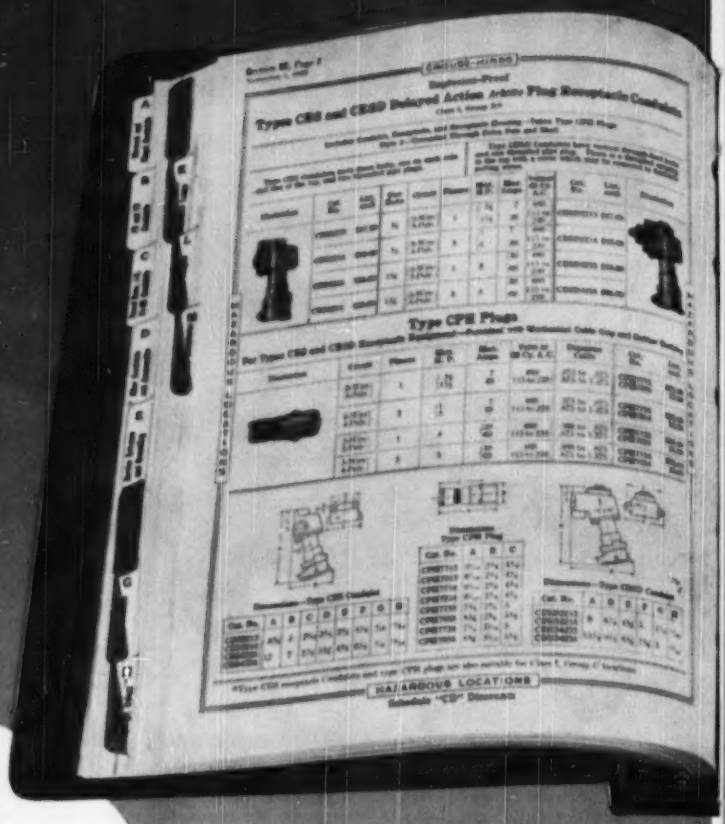
Sold through your insulator manufacturer only.

SERIES 9500 SUSPENSION CLAMPS

CATALOG NUMBER	MAX. CABLE DIA.	FITTING	ULTIMATE STRENGTH
9503 9533 9543	.83"	Socket Clevis None	18,000
9504 9534 9544	1.00"	Socket Clevis None	22,000
9505 9535 9545	1.15"	Socket Clevis None	22,000
9555 9565 9575	1.27"	Socket Clevis None	25,000
9506 9536 9546	1.375"	Socket Clevis None	25,000
9557 9567 9577	1.45"	Socket Clevis None	25,000
9507 9537 9547	1.60"	Socket Clevis None	25,000
9508 9538 9548	1.80"	Socket Clevis None	25,000
9509 9539 9549	2.00"	Socket Clevis None	25,000
9510 9580 9590	2.25"	Socket Clevis None	25,000

THE BREWER-TITCHENER CORPORATION, CORTLAND, NEW YORK

CROUSE-HINDS *Announces a*



. . . with many

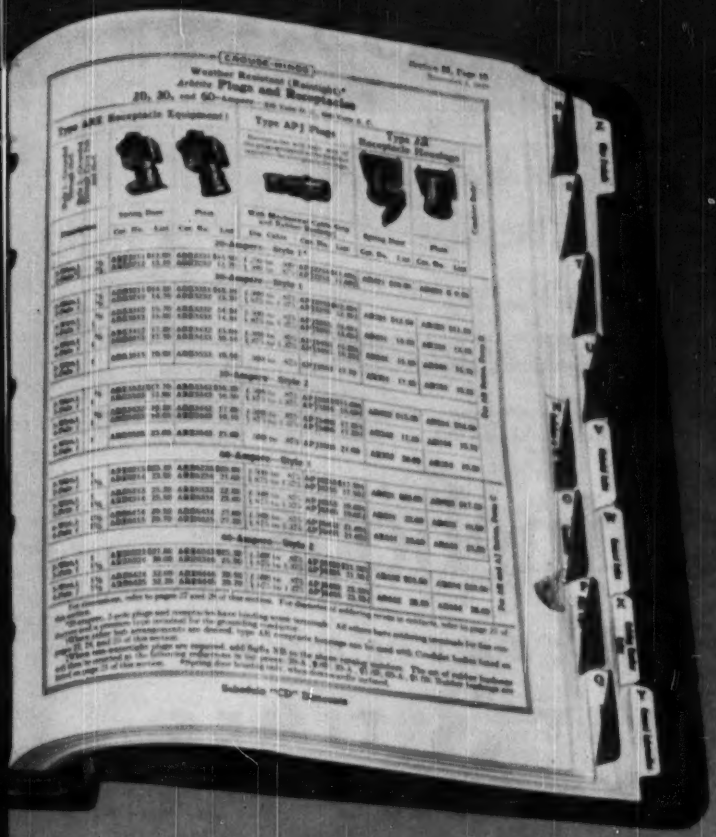
The many improved features in this catalog are the result of our years of cataloging experience combined with helpful suggestions from users of our products.

Among the outstanding features of the catalog are the logical divisions of Condulets into sections, the arrangement of the Condulets within the sections and the colored index tabs which simplify its use. For example, Section S contains listings of Condulets for industrial control. Section K contains listings of lighting fixtures

CONDULETS • TRAFFIC SIGNALS

NEW CONDULET Catalog

No. 3000



CONDULET

First in the field

STANDARD OF QUALITY

NEW features for your convenience

for general illumination. Section T contains listings of circuit breaker Condulets.

BUFF index tabs identify Condulets for use in non-hazardous locations.

RED index tabs identify Condulets for use in hazardous locations.

Combined RED and BUFF tabs identify Condulets for use in both hazardous and non-hazardous locations.

These features make this catalog a convenient reference book from which to select proper Condulets for required applications.

CROUSE-HINDS COMPANY

Syracuse 1, N.Y.

Offices: Birmingham — Boston — Buffalo — Chicago — Cincinnati — Cleveland — Dallas — Denver — Detroit — Houston — Indianapolis — Kansas City — Los Angeles — Milwaukee — Minneapolis — New York — Philadelphia — Pittsburgh — Portland, Ore. — San Francisco — Seattle — St. Louis — Washington. Resident Representatives: Albany — Atlanta — Baltimore — Charlotte — Cleveland — Columbus — Richmond, Va. — Salt Lake City

CROUSE-HINDS COMPANY OF CANADA, LTD., TORONTO, ONT.

AIRPORT LIGHTING · FLOODLIGHTS

Westinghouse

FLUORESCENT LAMPS

NOW LAST 3 TIMES AS LONG

YET COST NO MORE!

Three times the life, or ⅓ the cost! However you look at it, the new Westinghouse Fluorescent Lamps present a story of increased efficiency! You can trim expenses two ways: (1) by having to buy lamps less often, and (2) by having to change lamps less often.

Yes, Westinghouse lamps will last 2½ years in average store installations . . . 3 years in average one-shift offices or factories. Light output, too, has been increased. So, for longer life at lower cost, specify Westinghouse lamps.

Lamp Division, Westinghouse Electric Corp., Bloomfield, N. J.

LEADING THE FIELD

Since the war, Westinghouse has scored 35 firsts in producing new and improved light sources

YOU CAN BE SURE...IF IT'S Westinghouse

Foolproof formula for fast delivery!
By ordering basic Electri-Centers and Pushmatics of the desired rating, you can . . .
quickly assemble the Pushmatics on the mounting rib and . . .
prepare the Electri-Center for installation in a matter of minutes.

Amazing *Pushmatics*® permit immediate local delivery on any Electri-Center

Now you can give customers immediate delivery on custom-made Electri-Centers with BullDog's new merchandising plan.

Under this unique plan, Distributors keep inventories flexible and deliveries prompt by stocking basic Electri-Centers and assorted Pushmatics. When an order is received, the Distributor supplies the desired Electri-Center and additional Pushmatics of the correct rating and type for quick assembly and simple installation.

Revolutionary Pushmatics are responsible for this improved plan. They are identical in size, regardless of rating or type, and are individually interchangeable. In fact, *Pushmatics are just as easy to order and install as fuses,* and offer a much wider range of types and ratings *plus* automatic protection and push-button switching for customers.

There's a Pushmatic to meet every load condition: THERMAL ONLY, THERMAL-MAGNETIC, and THERMAL-MAGNETIC with exclusive AMBIENT COMPENSATING FEATURES. All are identical in size and contour, in ratings of 15, 20, 30, 40 and 50 amperes, 120 V., 1 pole, or 120-240 V., 2 poles, AC.

Your customers have read about Pushmatic's amazing features. Your Distributor can make immediate delivery on any Electri-Center. Now is the time to follow through with installations!

PUSH—It's ON!

PUSH—It's OFF!

PUSH—It's ON again!

*Push-button switch with automatic protection for electric circuits

Look at these Pushmatic features!

- Simple to install; plenty of wiring room
- Individual single-pole units . . . easier to add or interchange than multiple units
- Positive protection against overloads and short circuits
- Trip-free automatic operation
- All types and ratings interchangeable
- Permanent tripping calibration by precision forming
- Approved by Underwriters' Laboratories

BULLDOG

HEADQUARTERS FOR ELECTRICAL DISTRIBUTION

BULLDOG ELECTRIC PRODUCTS COMPANY

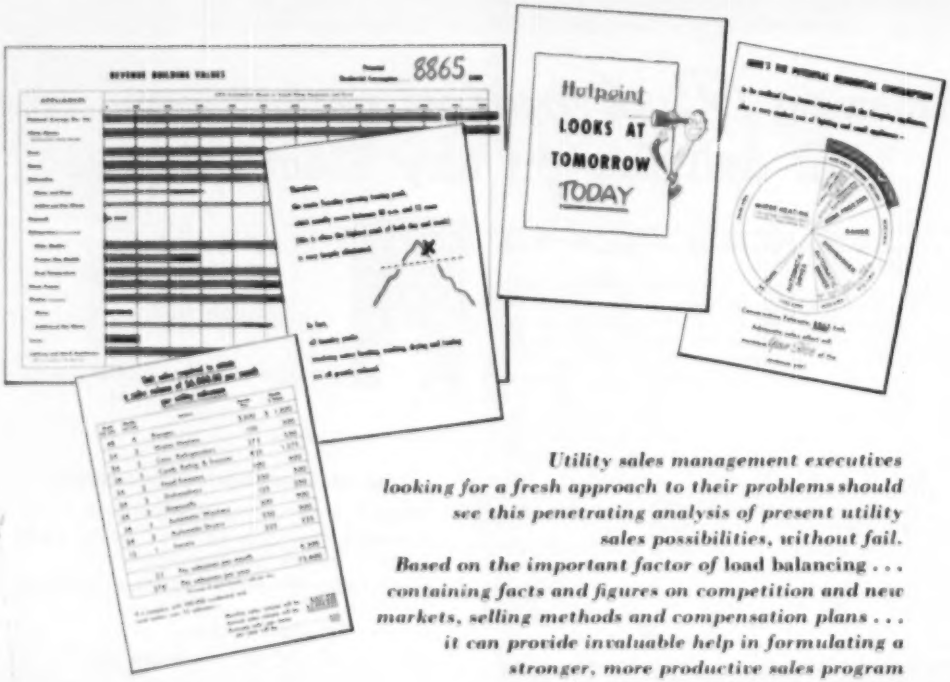
DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES

IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

"One of the most thought-provoking presentations it has been my pleasure to hear."

CARL T. BREMICKER
Vice President in Charge of Sales
Northern States Power Company
Minneapolis, Minnesota

. . . a new and thoughtful "balanced load" study designed expressly to meet today's utility sales objectives



Utility sales management executives looking for a fresh approach to their problems should see this penetrating analysis of present utility sales possibilities, without fail.

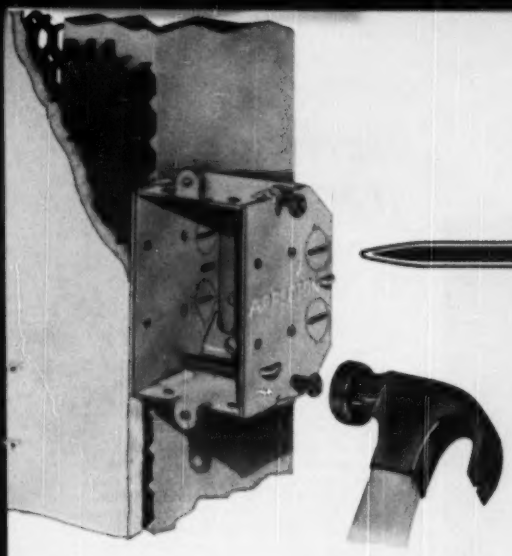
Based on the important factor of* load balancing . . . *containing facts and figures on competition and new markets, selling methods and compensation plans . . . it can provide invaluable help in formulating a stronger, more productive sales program and in stimulating dealer cooperation.

If your sales management group is interested in seeing this presentation, get in touch with

The Hotpoint Committee on Cooperation with Utility Executives, Hotpoint, Inc., 5600 W. Taylor Street, Chicago 44, Illinois.

Hotpoint

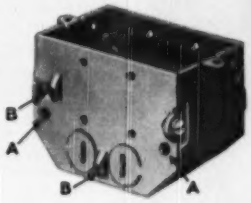
(A GENERAL ELECTRIC AFFILIATE)



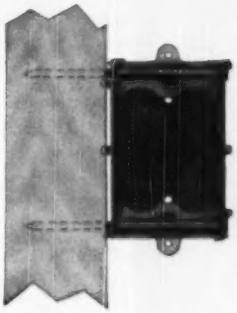
NAIL *these* APPLETON Switch Boxes direct to studding

QUICK . . . ECONOMICAL
WHERE SPEED AND ECONOMY COUNT

Side View Shows Nail Holes, (A) Leveling Ridges (B)



Leveling Ridges Assure Perfect Alignment



Here are sturdy, adaptable Appleton Switch Boxes, now modified to include nail holes for faster, firmer mounting. Besides easing your installation job, these special nail holes eliminate the need for mounting brackets, thereby reducing overall costs.

Each side of these boxes is equipped with leveling ridges—scientifically spaced to bite evenly into wood, line up box with studding, accurately, permanently.

These Appleton Switch Boxes are available in the exact type and size for your requirements for use with non-metallic sheathed cable, armored cable and rigid conduit. For the best in switch boxes—for any electrical fitting—specify Appleton—Standard For Better Wiring.

Write for complete catalog information

SOLD THROUGH ELECTRICAL WHOLESALERS

APPLETON ELECTRIC COMPANY

1709 WELLINGTON AVENUE • CHICAGO 13, ILLINOIS

LOS ANGELES 12, 100 N. Santa Fe Ave.

SAN FRANCISCO 1, 655 Minna Street

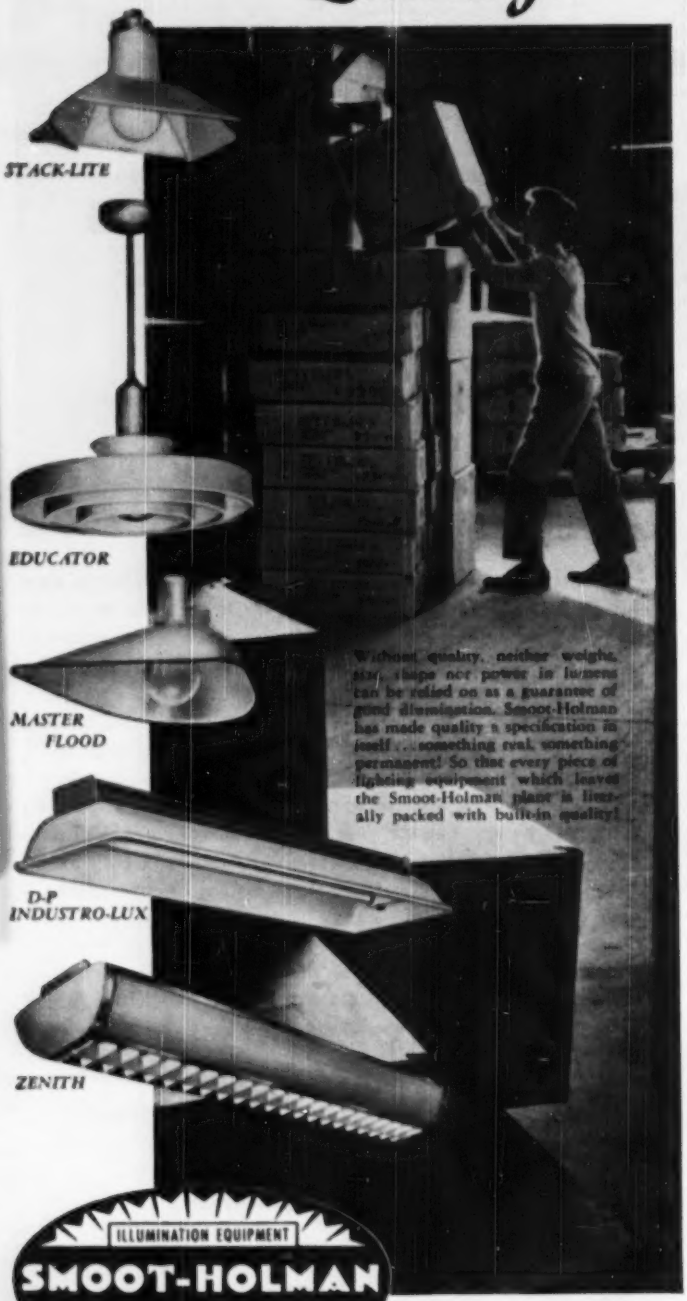
SEATTLE 9, 115 Ray Street

DENVER 2, 1921 Blake Street

APPLETON

CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

IT'S A CASE OF *Quality!*


STACK-LITE
EDUCATOR
MASTER FLOOD
D-P INDUSTRO-LUX
ZENITH
Without quality, neither weight, size, shape nor power in lumens can be relied on as a guarantee of good illumination. Smoot-Holman has made quality a specification in itself . . . something real, something permanent! So that every piece of lighting equipment which leaves the Smoot-Holman plant is literally packed with built-in quality!

ILLUMINATION EQUIPMENT
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA
MADE IN U.S.A.

OFFICES IN PRINCIPAL WESTERN CITIES
BRANCH AND WAREHOUSE IN SAN FRANCISCO

LETTERS TO THE EDITOR

To The Editor:

You and I have discussed problems very freely and frankly in the past, and this is one time I think you have it coming.

The story by Alfred M. Cooper which you published in the November issue, entitled *More Water in the West*, is untimely, misleading, untruthful, and presents a warped picture which will result in a very great disservice to California.

This article will undoubtedly be used, as I believe it was intended, by Arizona in the present controversy to prove that California does not need the water from the Colorado River; and is practically as valuable to the enemies of California as it would be had it been written by a recognized engineer who knew what he was talking about.

Why, oh why, would you publicize this man as an expert on water resources when men such as Samuel B. Morris, general manager, Department of Water & Power, City of Los Angeles; Evan Hughes, president, Imperial Irrigation District; Julian Hinds, chief engineer and general manager, Metropolitan Water District, and Franklin Thomas, dean of students, California Institute of Technology, and chairman of the Colorado River Board, State of California, who have the knowledge and background and a desire to convey the truth, are available.

Why should anyone deliberately leave out the names of "all California authorities," who "agree that the Navy method of producing fresh water from sea water is practicable," or the costs of water distillation, unless he wished to mislead his readers.

There are so many discrepancies, inaccuracies and misstatements in this article that it is impossible to call all of them to your attention here.

Sincerely,

Chester H. Dye
2060 N. Berendo St.
Los Angeles, California

To The Editor:

Reference is made to the lead article of your November 1949 number, *More Water in the West*, by Alfred M. Cooper. With its chief conclusion, there is of course complete agreement, that "there can be no valid excuse for asking citizens of other states to pay . . . to furnish more water for southern California's agriculture and industry." No responsible official in southern California has ever advocated or proposed any such contribution. The local region is determined and amply able to finance and thereby retain full control of all its water projects.

Likewise, with one of the two major premises on which this conclusion is based, there is also total agreement here. The author is entirely justified in eliminating from all consideration the proposal for a Columbia River diversion, even though it is so often artificially revived by federal reclamation spokesmen. The proposal is economically infeasible by a margin of several billion dollars. The author is to be congratulated on resisting the blandishments of this Lorelei of the Columbia.

Unfortunately, Mr. Cooper's rightness on his first premise did not save him from be-

There's Something New INSIDE*

National Electric XDUCT JUNIOR

Electrical Metallic Tubing

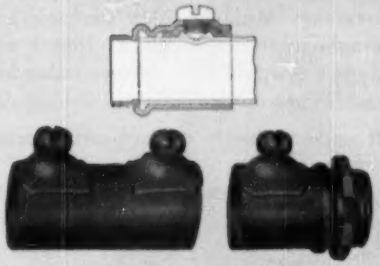
Look inside the *new* XDUCT JUNIOR and you'll see a hard, mirror-like finish.

- XDUCT JUNIOR is first electro-galvanized under an exacting control that produces a uniform, unbroken zinc coating.
- The inside is then further protected by a *complete* covering of clear enamel that will not crack or break down even under severe baking and bending. Weather elements have no effect on it.
- Exhaustive tests have proved XDUCT JUNIOR, coated with the new clear enamel, is more easily fished . . . resistance to wire pulling is definitely decreased. Appearance is improved 100% over the ordinary black enameled finish.
- The smooth, lustrous coating of clear enamel on the inside of XDUCT JUNIOR, is your assurance of permanent protection against abrasion, moisture and corrosion.

Now XDUCT JUNIOR is *better than ever!*

*Currently available on the ½" and ¾" sizes.

USE THE NE IMPROVED E.M.T. FITTINGS WITH XDUCT JUNIOR



- Vibration proof
- Easy to inspect
- Installed with a screw driver
- Permanent ground
- Close, accurate fit
- One-piece, pressed-steel body
- Electro-galvanized
- Easy to install in close quarters

XDUCT JUNIOR and E.M.T. Fittings are listed by Underwriters' Laboratories, Inc. Sold through leading electrical wholesalers.

Write for a copy of *"New Fittings for E.M.T. are Vibration Proof."* It lists sizes and catalog numbers.

NATIONAL ELECTRIC PRODUCTS
NE
WIRING SYSTEMS
WIRES AND CABLES

National Electric
PRODUCTS CORPORATION
1308 CHAMBER OF COMMERCE BUILDING
PITTSBURGH 19, PENNSYLVANIA

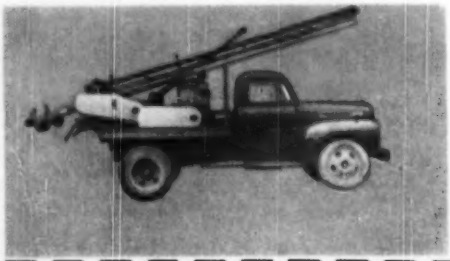
Fred tells a powerful story about hole-digging

"The Joslyn companies I work for, make and sell all types of electric line transmission materials. One day I was out watching some local REA boys putting down holes for their transmission line. The longer I looked, the more curious I got, for the drill unit sank the bit home unbelievably fast.

Since this was a "natural" to a line like ours I checked around until I found the manufacturer—and I've been riding herd on a Williams Hole Digger demonstrator ever since.

Frankly, I've seen nothing to equal its performance. Made in either mechanical or hydraulic types, the Williams Digger will put down a nine foot hole, eighteen inches in diameter, in *one minute* or less in *average earth*.

It works positively on hard earth, sticky clay, caliche, soft laminated rock, and even frozen ground.



If you've ever seen the demonstrator, you'll know what a rugged unit it is—and the punishment it will take. I've even slammed the bit through reinforced concrete—though the company looks the other way when I do it.

You can get these rigs in 3 standards sizes that will dig holes from 8″ to 36″ diameter and up to 20 feet deep—I can also furnish "specials" that will go down 60 feet or more and up to 54″ diameter.

This is no "untried" rig—this one has seen SERVICE—and it has proved cheaper to operate and maintain than any rig I've seen. Whether you want it for electric pole line holes, pier holes, anode work with pipelines, piling, or whatever—this Williams Digger is an "A" No. 1 outfit that will keep going when the others quit. Clip the coupon down at the bottom and I'll send you price and ordering dope and a list of users that you can write to—from Washington to Pennsylvania, Texas to North Dakota. Find out about it NOW!

p.s. Thanks for the swell reception and orders you've given me already.

Fred W Schroeder Jr

JOSLYN PACIFIC COMPANY
5100 District Boulevard
Los Angeles, California

NAME_____

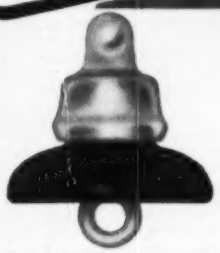
CO_____

ADDRESS_____

CITY_____ STATE_____

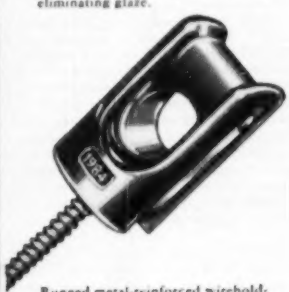
MAIL YOUR REQUEST TO NEAREST JOSLYN DISTRIBUTOR—OR TO ADDRESS SHOWN

...for all
HIGH VOLTAGE NEEDS
call
Porcelain Products



Rugged 6" Suspension Insulators—compression glazed for extra mechanical strength. Designed to withstand strain of wind and ice loads.

Pintypes that take a load off lineman's shoulders. Can be furnished with Type "N" radio interference eliminating glaze.



Rugged metal-reinforced wireholders with well rounded wire ways, heavy galvanized steel strap. Semi-float self-aligning action assures proper seating.

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Porcelain Products, Inc.
PARKERSBURG, W. VA.

ing equally, totally wrong on his second, that "the Navy method of producing fresh water from sea water is entirely practicable as a solution for the southwest's water problem." The author's assertion that "all California authorities agree" with this statement, is absolutely false; all know the exact opposite, as a result of adequate study and much discussion of the subject here recently. The lowest attainable unit cost by distillation is about fifteen times the total (capital and operation) cost of the Colorado River aqueduct softened water, and absolutely prohibitive for every normal type of water use.

Every informed person, of course, knows that the small-scale reclaiming of fresh water from sea water is easy from an engineering and technical standpoint but is completely impractical as to cost for large-volume production. In the August 1949 *Reclamation Era*, in an article (page 162) ascribed to Oscar Chapman, now Secretary of the Interior, the statement is noted:

"It is evident that the cost of distilled water is still much too high for municipal use, except perhaps in a few isolated or emergency situations, and that distillation by today's known methods is entirely infeasible for providing water for irrigation use, both from the standpoint of cost and production quantities."

Several serious erroneous factual statements slipped into Mr. Cooper's article such as:

1. "There exists in California ample supplies of natural gas and petroleum sufficient to carry on essential water distillation operations."

This may be true in the unintended sense that, due to prohibitive costs, practically no water distillation operations are essential or practicable here, but the fact is that California is now forced to import immense volumes of natural gas for fuel from Texas gas fields. And about one-quarter of California's entire fuel oil production would be required to distill enough sea water to replace merely one present water project (the Colorado River Aqueduct) though the present fuel oil margin of surplus is slight and certainly only temporary.

2. "Atomic scientists have replied that . . . atomic energy for distillation of sea water, etc."

In *Engineering and Science* for November 1947, Dr. I. A. Du Bridge completely disposes of such fallacies. . . .

3. "The Metropolitan Aqueduct . . . cost half a billion dollars to construct."

In the caption to an excellent Aqueduct photograph on the preceding page, the same cost is given as $225,000,000. Actually it was slightly less than $200 million.

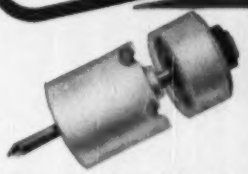
4. "As of now, California is utilizing 5,362,000 acre-ft. of Colorado River water annually and . . . another 1,200,000 acre-ft. of this water has been granted by treaty to the Republic of Mexico."

In fact, the mentioned treaty really grants to Mexico 1,500,000 acre-ft. of Colorado River water annually, with an additional 200,000 acre-ft. annually in years of so-called "surplus." This larger grant contributes greatly to the acuteness of our long-continued Arizona controversy.

The amount ascribed to California as its present use is actually the total of the state's contractual rights and ultimate future use of water from the Colorado River. The state's gradually increasing consumptive use of Colorado River water is now slightly less than 3,500,000 acre-ft. annually, or 65% of its legal rights.

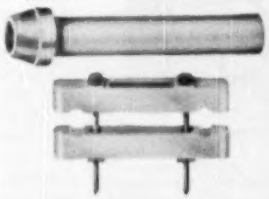
Southern California areas of present water shortages are in most cases proceeding rapidly to secure rights to needed aqueduct water. The cost of pipe connections to the aqueduct is, in some such cases, a major

...and for
LOW VOLTAGE TOO!
call
Porcelain Products



Dense, good looking, positive gripping ALLIGATOR Nail Knobs are preferred by electricians insisting on workman-like installations to build good-will and repeat business.

Outlet boxes with Adjustable Metal Mounting lugs and set of Hangers are nationally famous for durability, ease of installation and safety features.



A complete size range of tubes as well as 2 and 3 wire cleats are available for immediate delivery. Made precisely to give long and satisfactory performance.

Both round and oval type split for-estry insulators as well as telephone insulators are available for immediate delivery.

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Porcelain Products, Inc.
FINDLAY, OHIO

NEW AIR-COOLED
DISTRIBUTION TRANSFORMERS

POLE MOUNTED — OUTDOOR — ALL-PURPOSE — INDOOR — WALL MOUNTED

MARCUS SCORES AGAIN IN THE FIELD OF AIR COOLED TRANSFORMERS

AIR-COOLED TRANSFORMERS
1 to 2,000 KVA up to 15,000 Volts to meet individual Requirements
- DISTRIBUTION
- GENERAL PURPOSE
- PHASE CHANGING
- ELECTRIC FURNACE
- RECTIFIER
- WELDING
- MOTOR STARTING

From a Pioneer in the field comes a new distribution transformer—AIR COOLED, DRY TYPE. No hazardous oil or toxic liquids to fuss or bother with. The use of superior class B and C heatproof insulation such as fibre-glass, mica, porcelain, new Johns-Manville Quinterra and similar inorganic material results in a transformer that can withstand the overloads that normally would damage an ordinary class A (cotton and paper) insulated oil filled unit. The entire transformer element is seal protected against oil, acids, moisture, etc., and is housed in a sturdy, scientifically ventilated, weatherproof case which conforms with all applicable EEI-NEMA construction standards. This extremely versatile transformer can be used outdoors, pole or platform mounted or indoors at the load center, mounted wherever convenient with no expensive fireproof vault required.

Currently available in sizes to 100 KVA, voltages to 5000 V.

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MARCUS TRANSFORMER CO. INC.
40 MONTGOMERY STREET
HILLSIDE 5, NEW JERSEY

PIONEERS IN THE FIELD OF AIR-COOLED TRANSFORMERS

obstacle but, in all known instances, the needed investment is only a small fraction of the cost for pipes and pumping plants to reach ocean beach distillation sites, even if this process were not entirely impracticable.

Very truly yours,

Julian Hinds
General Manager and Chief Engineer
The Metropolitan Water District
of Southern California
306 W. 3rd St.
Los Angeles 13, Calif.

ELECTRICAL BOOKS

ELECTRONICS: Experimental Techniques, by W. C. Elmore and Matthew L. Sands, 417 pages, 6x9, McGraw-Hill Book Co., $3.75. Describes the most useful and the most successful circuits for making nuclear and other physical measurements. Besides describing complete circuits — pulse amplifiers, counting circuits, sweep circuits, timing circuits, testing equipment, etc., the book contains a discussion of the circuit elements that constitute the basis of the complete circuits. An excellent background is given for the design of new circuits.

FUNDAMENTALS of VACUUM TUBES, third edition, by Austin V. Eastman, 644 pages, 6x9, McGraw-Hill Book Co., $5.50. A timely revision of a well-known, widely used text. Covers the principal types of vacuum tubes, the laws underlying each, with engineering analyses of the more important applications. New material has been included on video amplifiers, cathode-follower amplifiers, cathode-coupled amplifiers, R-C oscillators, ground-grid amplifiers, pulse modulation, and demodulation.

ELECTRICAL ENGINEERS' HANDBOOK, fourth edition, by Harold Pender and William A. Del Mar, 19 sections and index, 6x9, John Wiley & Sons, $8.50. This fourth larger and greatly expanded edition of a popular handbook follows practice established with the third edition of dividing electric power and communication into two volumes. Careful selection and compression have been exercised to keep the books compact and readable. Bibliographies have been prepared with the idea of assisting the reader to further study of each subject. Seventy-one specialists have contributed to this fourth and entirely rewritten edition. New material and new subjects include circuit stability and symmetrical components, electronic rectifiers, aircraft equipment, heat pumps, servo mechanisms, permanent magnets, plastic insulating materials, and induction and dielectric heating apparatus.

DIRECT-CURRENT ARMATURE WINDINGS, by Charles S. Siskind, 149 pages, 7x10, McGraw-Hill Book Co., $3. A new text treating fundamental principles of modern d-c armature windings in a simple, understandable form. Subject is developed logically and systematically to aid the student in understanding that, although the subject is complex, it is composed of the combination of simple ideas. Original simplified formulas are given for the calculation of the construction details of all types of windings. Problems are worked out to show how windings must be modified to give changed operating characteristics.

Prove to your own satisfaction, as others have, that "Glazon" is the building wire for your jobs. Prove to yourself that it pulls easier . . . twists around bends more flexibly . . . handles better than any other building wire you've ever used!

Prove, too, that "Glazon" means longer life . . . better protection . . . greater resistance to exposure and deterioration. And prove to yourself what others have learned: that "Glazon's" easier handling and longer life—at no extra premium—all add up to today's greatest building wire value!

What "Glazon" Is:

"Glazon" incorporates a tougher, smoother, longer lasting braid based on continuous filament glass yarn—which cannot rot, burn, absorb moisture or deteriorate with age. Special saturants bond permanently to individual fibers, setting new standards of resistance to moisture, fire and rot. Result: smaller diameter, greater flexibility, smoother surface—in short, vastly improved fishability...combined with still longer life.

The Right Combination—"Glazon" protective coverings combine carefully controlled braiding, specially developed saturants—and manufacturing technique exclusive with Triangle. "Glazon" means building wire at its best!

The Trade Mark Of Top Value

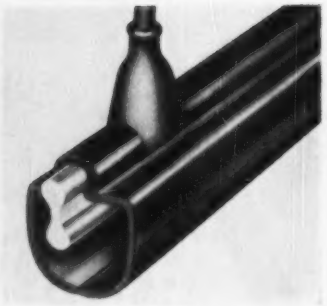
TRIANGLE CONDUIT & CABLE CO., INC.

1904 JERSEY AVENUE • NEW BRUNSWICK, NEW JERSEY

IT *MUST* BE RIGHT!

"Glazon" & "Trioseal" Building Wire • "Tricon" Control Wire • "Adaptal" General Purpose Wire • "Triex" Non-Metallic Sheathed Cable • "Trioprene" Trench Cable • Service Entrance, Parkway, Power & Varnished Cambric Cables • "Tristeel" Flexible, Thin Wall & Rigid Steel Conduit

PRODUCT NEWS



Crane Conductor Bar Protection

(100) Calabar Corp., 8414 Otis St., South Gate, Calif.

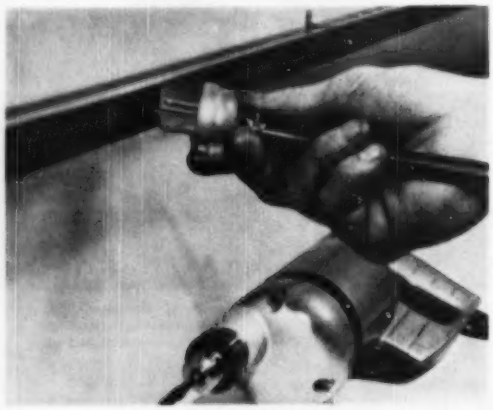
Con-L-Duit is a new safety enclosure affording protection against accidental contact with open bars used on cranes and monorail installations offered by the Calabar Corp. It is a specially compounded neoprene-base rubber insulation that totally encloses the conductor. Con-L-Duit is engineered for installation on any new or existing figure-8 trolley or conductor bar system. A specially designed slide-type shoe collector operates wholly within the Con-L-Duit enclosure under light spring pressure. The shoe is mounted on an elongated oval stud, as shown, which extends downward through a continuous slit in the Con-L-Duit enclosure. This stud parts the rubber as the collector travels in either direction.

The neoprene enclosure slips over the figure-8 bar and is locked in place by machine-formed, spring steel clips, spaced 12 in. apart. Support clamps fit the neck of the enclosure and conductor bar for positive support. Low cost and ease of installation are features. Con-L-Duit complies with the Safety Orders of all states. Many codes now require all electrical conductors on old or new installations to be totally enclosed.

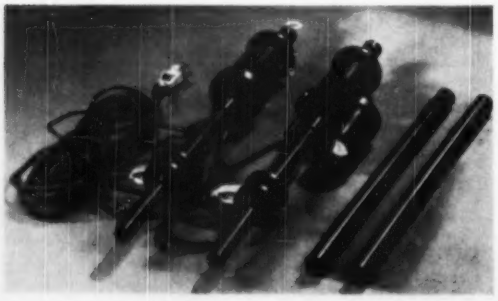
High-Voltage Testing Equipment

(102) Safety Electric Equipment Co., 2 Linares Ave., San Francisco, Calif.

Safety voltage detectors combining hot sticks, leads, potential transformer and meter for voltages of 1,000 to 70,000 is offered in a new line of equipment. The tools, illustrated, provide a safe, light and convenient portable device for use under all weather conditions for phasing, ascertaining whether line is alive or dead, locating blown fuses and other tests. The current is first reduced to a non-hazardous value and then carried between the two staffs by a high-voltage cable. Indication is by either neon tube or voltmeter. In wet weather ground connections can be put on to carry any creepage to ground that comes down on the outside of the staffs. Extension handles may be added to lengthen the staffs when desired. A d-c a-c test coil for testing the detector in the field is part of the equipment.

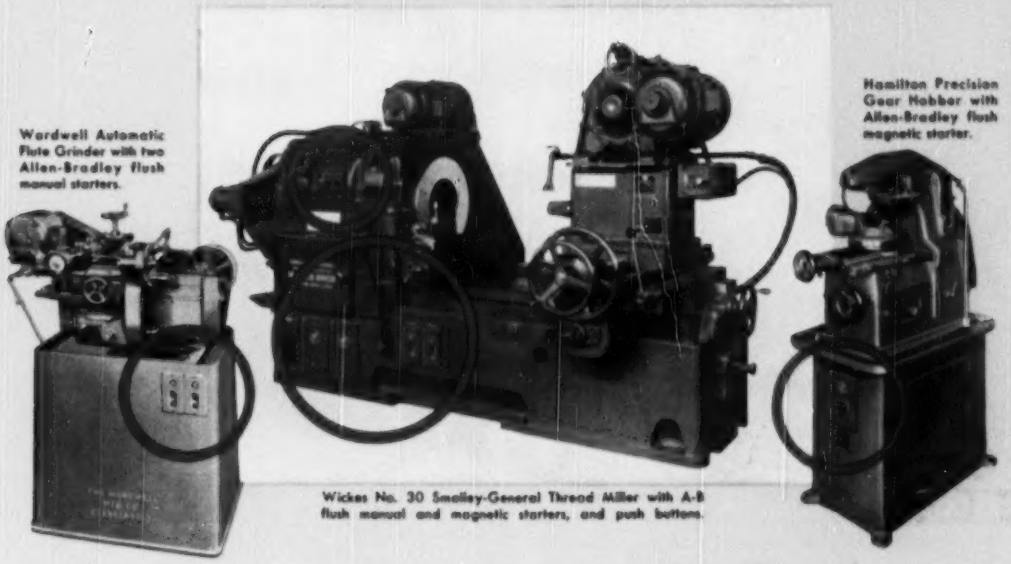


(101) A Plug-In Strip with grounded receptacles provides electrical outlets at either 6- or 18-in. intervals. Basic construction has not been changed, but a third slot has been provided adjacent to the conventional two slots. Beneath this aperture is a copper insert mounted to the outlet's steel base to give positive grounding facility. To get a thoroughly grounded electrical system, the Plug-In Strip must be installed with positive ground to earth. Underwriters' approved; made by National Electric Products Corp., Chamber of Commerce Building, Pittsburgh, Pa.



Built-in Motor Controls

modernize the appearance of your shop



Wardwell Automatic Flute Grinder with two Allen-Bradley flush manual starters.

Hamilton Precision Gear Hobber with Allen-Bradley flush magnetic starter.

Wickes No. 30 Smalley-General Thread Miller with A-B flush manual and magnetic starters, and push buttons.

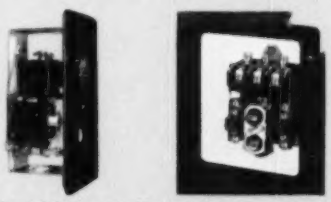
Many machinery builders are now equipping their motorized machines with flush mounted controls. Above are a few examples of machines with "built-in" push buttons and motor starters.

Notice the smooth appearance of the machine bases. There are no control boxes to break the streamlined design . . . no exposed conduits to clutter the installation.

When designing special machinery for your own plant, streamline its appearance with built-in controls. We shall be glad to send descriptive literature on these flush type starters.

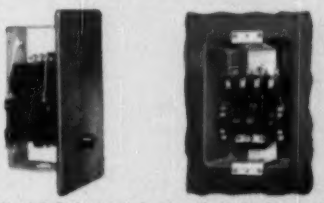
Allen-Bradley Company, 1316 S. Second St., Milwaukee 4, Wis.

BULLETIN 609 MANUAL STARTER



At left—A-B flush mounted manual starter in open type construction for enclosed recesses. At right—A-B manual starter in flush mounted cabinet for installation in open recesses.

BULLETIN 709 MAGNETIC STARTER



At left—A-B flush mounted automatic starter in open type construction for enclosed recesses. At right—Form 1 A-B unit installed in enclosed machine recess, with cover off.

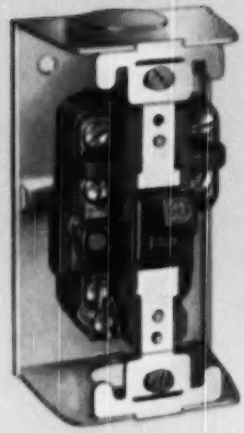
A-B Quality

ALLEN-BRADLEY

QUALITY

TROUBLE FREE MOTOR STARTERS

with RELIABLE OVERLOAD PROTECTION



For Fractional Horsepower Motors

The National Electrical Code requires overload protection for all fractional horsepower motors started automatically or by remote control. The Bulletin 600 switch satisfies this need. Its dependable, accurate, thermal breaker trips the switch under a sustained overload, and protects the motor against burnout.

QUICK MAKE AND BREAK CONTACTS—The simple, rugged, over center mechanism provides quick make and quick break contact action . . . therefore, long contact life.

GENEROUS WIRING SPACE—Though compact, this small switch provides plenty of wiring space. Its metal cover slips off, exposing front and two sides.

EASY TO INSTALL—No need to remove the starter from the enclosure during installation—saves at least 10 minutes of installation time.

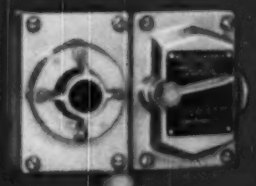
ATTRACTIVE APPEARANCE—This starting switch, with its clean, modern lines, is a sales asset to any motorized machine.

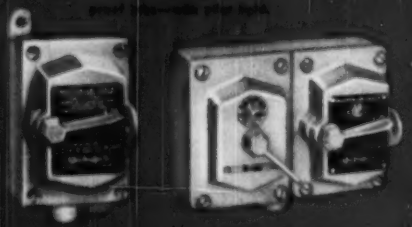
Allen-Bradley Company
1316 S. Second St., Milwaukee 4, Wis.

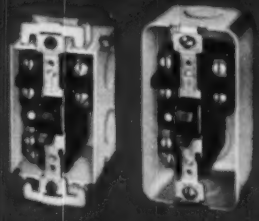
ALLEN-BRADLEY

BULLETIN 600 STARTING SWITCHES FOR SMALL MOTORS

A-B Quality





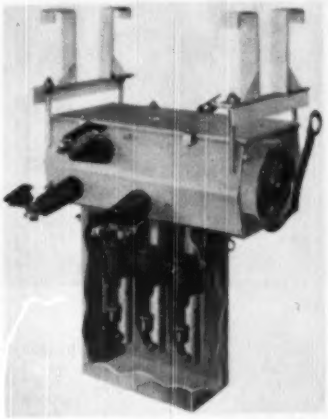


Automatic Service Restorer

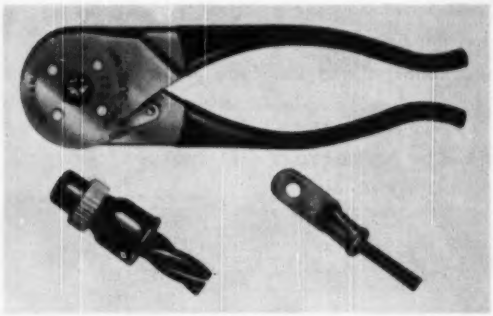
(103) Pacific Electric Mfg. Co., 5815 Third St., San Francisco 24, Calif.

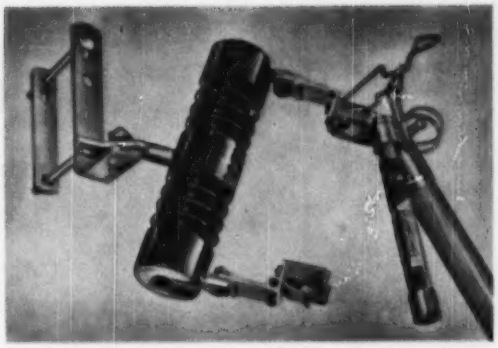
Important engineering and mechanical improvements in its line of types AP-1 and 2 automatic service restorers have been announced by Pacific Electric Mfg. Co. Reclosing "circuit-breaker type" protection at investment cost matched to the income from small but important loads is afforded by these 3-pole automatic manual-rewound reclosing restorers. Three types are available with voltage range from 2.4 to 15 kv., continuous current ratings from 100 to 200 amp., all with interrupting capacity of 1,200 amp. Features of the restorers are shown in the accompanying cutaway view.

By selection of suitable inverse-time delay, trip-open time and time-delay reclosing, the restorer may be adapted to various conditions as well as coordinated with other circuit-opening devices. Time-delay reclosures after the first are adjustable from one to ten seconds. Lock-open takes place after the fourth trip-open. Advantages listed in catalog 830 include: no fixed expense for supplies at each interruption; marked reduction of attendance expense per interruption; a non-company person often may wind the restorer; improved maintenance of service; and flexible coordination with other circuit-opening devices. A motor-wound restorer also is available for important loads.



(104) A new pressure-tool for solderless electrical connections will splice all wire combinations from two No. 18 to three No. 8 and will terminate all wire sizes from No. 16 to No. 8. Designated C22, it replaces Buchanan's S10 and S11, and incorporates positive 4-way crimping action, said to be equally effective on solid, stranded or combinations of solid and stranded wires. Eight inches long; can be operated with one hand. Tool made by Buchanan Electrical Products Corp., 1290 Central Ave., Hillside, N.J.

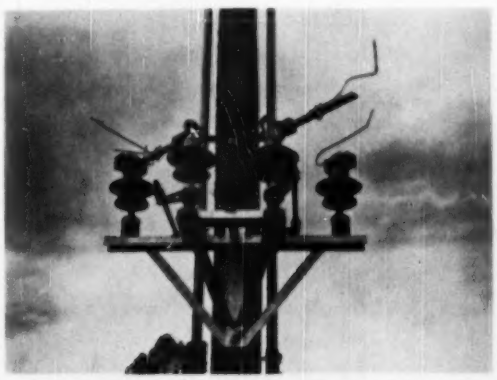




Simplified Mountings for Liquid Fuse

(105) S&C Electric Co., 4425 Ravenswood Ave., Chicago, Ill.

This single-insulator mounting for the S&C liquid fuse is claimed to give power fuse protection of 7,500- and 15,000-volt distribution transformers and substations at ordinary open-type cutout prices. Insulation values have not been sacrificed in this smaller, lighter and less expensive mounting, according to the manufacturer. By recessing the end inserts in the porcelain, leakage and arcing distances have been increased to give insulation values exceeding NEMA standards for cutouts and equaling NEMA standards for switch and bus insulators. A resilient cement holds end and mounting inserts in alignment without damaging strains in porcelain, even during rapid temperature changes. Clips are designed for handling fuse with hook stick from a pole, structure or ground. Available in ratings of 7,500 and 15,000 volts, ½E to 125E amp., and with short-circuit interrupting ratings of 3,900 to 8,600 amp., r.m.s., asymmetrical. Photo shows side view, with hook stick handling of fuse.



(106) Matthews GOABS (gang operated air-break switches) are claimed to be a new idea in 3-phase switching, and an engineered package that will reduce installed cost of 15- to 69-kv. switches over older method of accomplishing the same results. Easier and safer maintenance also is claimed. Two galvanized steel frames sizes handle the five ratings: the smaller will take 15- or 23-kv. insulators; the larger 34.5 to 46 or 69 kv. Current-carrying parts and contacts rated 600 amp. Catalog information diagrams, cost data and field test results are given in bulletin 601 available from W. N. Matthews Corp., 3850 Delor St., St. Louis 16, Mo.

For $17.22 You Can Modernize Your Present Transformer Protection With

The KEARNEY QRC

(Combination Fuse Cutout and Lightning Arrester)

Your *present* transformer installed on a pole represents a sizeable investment. Protecting your investment means protecting against damage from two causes . . . lightning and overloads. One unit, the KEARNEY QRC expulsion arrester-fuse cutout combination, does both jobs . . . for $17.22.

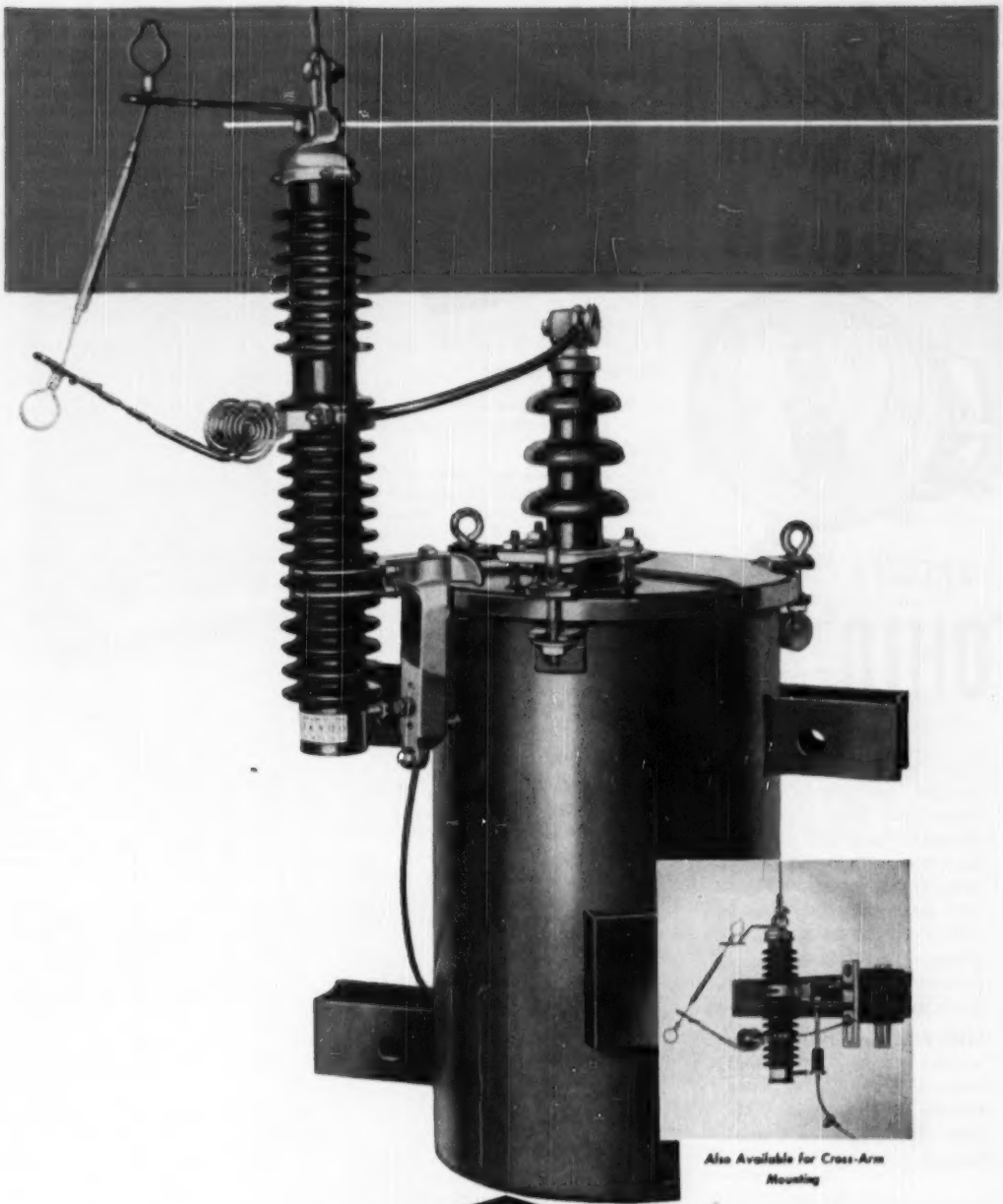
Today's transformers offer one thing more than your present transformer . . . *combined protection*. It is not necessary to replace your complete transformer installation to have this security. No special crossarms are needed; the QRC mounts right on top of the transformer tank. No higher poles are needed; one man can make the installation.

The Kearney Combined Protection Unit expulsion-gap arrester interrupts follow-current at first current zero. The Trip-O-Link cutout, fused with a Kearney Type X fuse link, gives protection at both ends of the current range . . . for short-duration "surges" and long-duration "dragging overloads."

Conventional transformers protected with the Kearney combination unit will mean full return from your present investment. Complete technical data on the Kearney QRC arrester-cutout combination and the Type X transformer fuse is available, write today.

James R. Kearney Corporation
4236 Clayton Avenue • St. Louis 10, Mo.

West Coast Distributors: **MAYDWELL and HARTZELL, Inc.**



Also Available for Cross-Arm Mounting

Always Specify JAMES R. KEARNEY CORPORATION ST. LOUIS, MO. *for the Job...*

Better Construction – *SAFER* Maintenance

OHIO MOTOR BRUSHES offer you the maximum in efficient commutation. They are "precision-made" and are processed by us from raw materials through to the finished product. For complete motor brush service look to "OHIO" from all standpoints, engineering, new development, special requirements and dependable manufacturing.

SEND FOR our reference book in your category:—Industrial, General Purpose, Mining, Welding, Refrigeration, Appliances, Automotive, Carbon Specialties.

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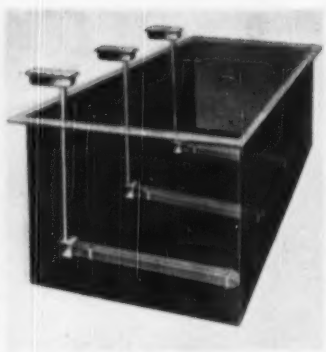

Immersion Heater

(107) Edwin L. Wiegand Co., 7540 Thomas Blvd., Pittsburgh 8, Pa.

For heating oil and water solutions, tar, glue and similar compounds, these portable tank immersion heaters are rated from 2 to 18 kw., 115 to 550 volts, single or three phase. Copper, steel, Inconel or stainless steel sheath is available, depending upon corrosive properties of solution to be heated. Heated section comes with two or three hairpin elements, the former for uniform dissipation of heat over length of tank; the latter for high concentration of heat in confined areas.

Service Station Panel

(108) Square D Co., Western Division, P. O. Box 2115, Terminal Annex, Los Angeles 54, Calif.

A service station panel incorporating all of the electrical needs of the average-size gasoline service station has been put into stock production by the Square D Co., Western division. The first of such units has been installed in several Union Oil Co. stations. The unit, illustrated, permits overhead or underground power company service; has facilities for mounting power company single-phase socket-type meter; test blocks are under a sealable cover. Provision has been made to accommodate all of the circuits needed for operating; a battery charger, a heater, six gas pumps, compressor, lighting and convenience outlet plugs. The panel will take up to a 100-amp. main circuit breaker; has UL label approving it for use as service equipment.

An installation feature is a removable bottom plate on the panel. The electrical contractor can dig trenches for underground circuits before construction begins, then use this bottom plate as a conduit template to space his risers. The cabinet can then be installed after the framework of the building is in place. Another feature is an interlock switch controlling the compressor and the night light which prevents the compressor from operating when the night light is on. While the new panel was designed specifically for requirements of service stations, it is recommended for use in markets and small commercial establishments. It can be used with or without the motor starter installed. The panel is available and has been added to the "in-stock" line.

(109) MOTORS—New type SK, d-c Life-Line motors in 1- to 30-hp. ratings are available from Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa. They retain the basic design of earlier SK motors, but have the same all-steel construction used in a-c Life-Line motors. Are available for constant, adjustable or varying speed applications for continuous or intermittent service; can be supplied with shunt, compound or series windings; are designed for operation from 115, 230, 550 or 660 volts.

(110) SWITCHES—A new line of braidless disconnecting switches for 7.5- to 69-kv. outdoor service has been announced by the switchgear division of General Electric Co., Schenectady, N. Y. Designated type RF, they are a rating extension of the high-voltage (115-, 161- and 230-kv.) units previously available. They feature silver-to-silver line pressure contacts, a simplified operating mechanism and complete elimination of current-carrying braids. Bulletin GEA-4980 gives details.

(111) SPLICE—A new tapered sleeve splice eliminates necessity of sling users splicing their own sling loops. The rolled loop and single tapered sleeve are said to provide greater flexibility and compactness, to develop full catalog strength of the preformed "Blue Center" steel wire rope sling. Product of John A. Roebling's Sons Co., Trenton 2, N. J.

(112) FIXTURE—A new all-metal shielded fixture for the T-12 slimline lamps, the Luvex, is announced by Day-Brite Lighting Inc., 5411 Bulwer Ave., St. Louis 7, Mo. Designed basically for two 75-watt, 96-in. lamps, it is available also in sizes for two 72-in., 60-watt slimline and two 48-in., 40-watt slimline lamps. Ballast equipment is for 430-ma. operation. The Luvex is available also for standard 48-in., 40-watt F lamps.

YOU CAN BE SURE.. IF IT'S
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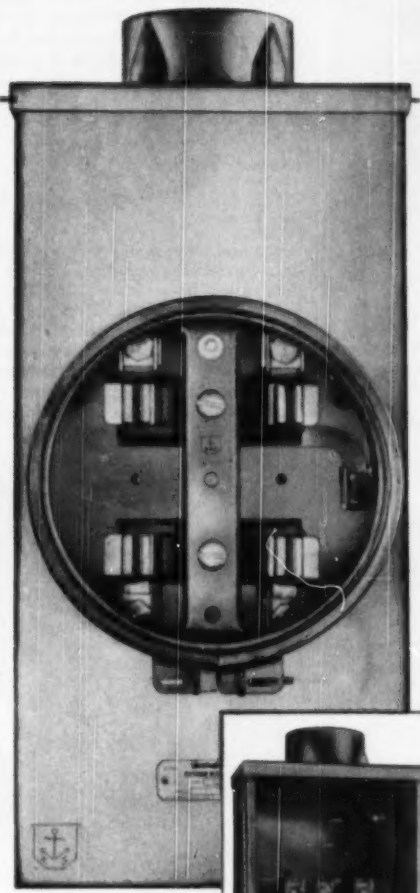
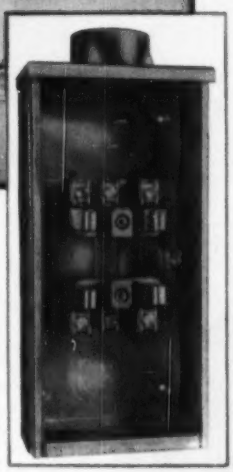
NEW

HEAVY-DUTY METER SOCKET

Cuts Costs!





Interior view of Type STU four-jaw socket with 2½" hub for use with single-phase, 50-ampere socket meter.

Also available: Type STU five-jaw socket with 2½" hub for use with 2-phase, 3-wire grounded neutral socket network meter. (Type-CS-5.)

NOW you can eliminate the expense of special meter boxes by using the new Type STU meter socket for heavy current loads. Westinghouse has designed a self-contained socket that can take standard S-type meters. Installation costs are cut 'way down. Here are the reasons why:

A Socket takes up to No. 0000 cable . . . eliminating overheating. In fact, the large-size cable actually draws heat *away* from meter.

B Removable jaws and terminals in this new Westinghouse socket allow meter box to be mounted at convenience of contractor, prior to connecting up service wires.

C 175-amp socket uses standard parts and standard meters—allows the use of the right-sized conductor for the load requirements of the consumer.

Contractors will find this Westinghouse meter socket is just right for athletic fields, outdoor pumping installations, for electrically heated homes, for many other large load requirements. For more details on this moneysaving socket, ask for supplement to catalog 42-110, effective January 20, 1950. Call your nearest Westinghouse office or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. J-40375-A

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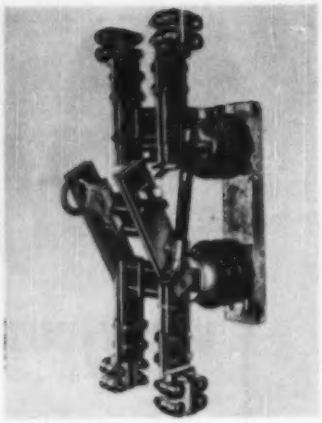
WATTHOUR METERS

DEPENDABLE
Floodlighting
WITH MINIMUM
MAINTENANCE

Pyle-National heavy duty floodlight equipment is built to withstand severe operating conditions; to provide the reliable lighting needed for protection, and for outdoor night work. Pyle-National reflector design and light control lenses assure high efficiency lighting with proper distribution for maximum usefulness. The wide range of types and sizes, from 100 watts to 2000 watts, allows individual requirements to be met easily and economically—substantial weatherproof construction with sealed interior gives maximum protection to reflector and lamp bulbs. Interior cleaning and other maintenance is greatly reduced. Write for Catalog 2100 giving full information, with beam efficiency, candlepower, and light distribution data.

THE PYLE-NATIONAL COMPANY
1334 N. Kostner Avenue, Chicago 51, Illinois

Pacific Coast Sales Office
25 Beale Street, San Francisco 6, Calif.



Regulator By-Pass Switch

(113) The James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo.

This new 1,200-amp. regulator by-pass switch provides automatic switching sequence for high-current capacity voltage regulators in one unit. Heavy bus-bar construction and silver-to-silver overlay contacts of line-pressure design form high-conductivity path for heavy currents. The four steps required in removing regulators from the line are performed with one switch operation: regulator is by-passed; regulator leads are disconnected; the exciting current is interrupted safely in an arc-extinguishing auxiliary switch. Available with or without auxiliary switch in two voltage ratings, 15,000 and 7,500.

Watt-Hour Meters

(114) Roller-Smith Division, Realty and Industrial Corp., Bethlehem, Pa.

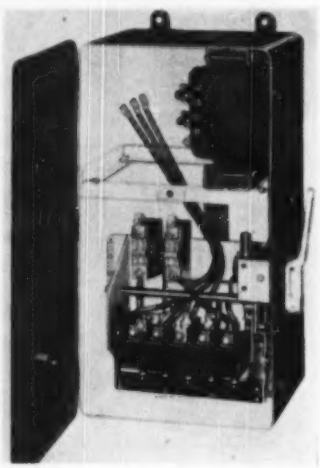
Returning to watt-hour meter manufacture after 30 years, Roller-Smith is in production with a single-phase socket-type model for house service. It is being made in 2- and 3-wire, 5- and 15-amp. rating, for 120- or 240-volt, 60-cycle service, with choice of standard clock type or cyclometer registers. Under development since 1946, the new meter, type S-3, was approved under the ASA Code for Electricity Meters last fall. Plans are underway for design and production of polyphase watt-hour meters for switchboards. Roller-Smith entered the meter field first in 1909, had not made any models since World War I.

Manual Starter

(115) Allen-Bradley Co., Milwaukee, Wis.

A manual, autotransformer-type meter for squirrel-cage motors is available in four sizes from 5 hp., 220-440-550 volts to 250 hp., 440-550 volts; for 25, 50 and 60 cycles. Switch mechanism operates with quick-make, quick-break action. Two automatic reset overload relays are standard equipment.

The new line comes in two forms—



T, with air-break contacts; X, with oil-immersed contacts. The air-break form can be converted to oil-immersed operation by adding a standard oil-tank, supported beneath the switch.

A time-delay under-voltage release, that prevents unnecessary opening of the switching mechanism on slight voltage dips, is standard on the largest, size D, starter. It can be supplied at extra charge on A, B and C starters.

All bulletin 646 autotransformer-type starters have an adjustable time-delay mechanism for controlling length of the accelerating period before switching the motor from starting to running taps. This period is adjustable from 0 to 15 seconds. The factory setting is for about 5 seconds.

"Anaconda"...always means

Keeping-Ahead-of-the-Parade

TAKE CB* CABLE WITH F-3**
ALLOY SHEATH FOR INSTANCE:

In 1939

Anaconda engineers introduced Type CB cable because ordinary paper-insulated cable wasn't good enough. Carbon-black paper removes oxidation products from the insulation, eliminates ionization discharges. These and other desirable properties increase insulation stability and assure longer cable life.

In 1944

Anaconda engineers added the resilient binder for they had found a way to reduce sheath strain during daily load cycles. Made of special carbon-black paper, it is strong yet resilient, results in lower stresses in the sheath due to cushioning effect, conducts radially and is fully adequate against magnetic forces.

In 1944,

because they know cable life often is shortened by premature sheath failure, Anaconda engineers gave this Type CB cable the amazing F-3 alloy-lead sheath. It is the best all-around alloy ever offered in the industry . . . resists slow-bending fatigue, creep (expansion), bursting, abrasion, vibration fatigue and does not age-harden . . . actually extends sheath life more than three times ordinary sheath. It has truly earned the name "indefatigable."

*CB—Carbon-Black. Trade Mark Registered U. S. Patent Office
**F-3—Arsenic-Lead alloy (U. S. Patents 2,330,758 and 2,374,755)

THIS COMBINATION permits heavier loads for longer life!

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Since 1857

If you know linemen, you know they want the finest in quality when it comes to equipment. Not only does their job depend on it—many times their lives do.

It is the reputation of nearly a century in designing and manufacturing the finest in linemen's equipment that has won Klein its position of preference with linemen and electricians everywhere.

It is easy to make equipment that looks like Kleins. It takes years of experience plus extensive manufacturing facilities to make equipment that performs like Kleins.

Today you are assured prompt delivery on all Klein products. Be sure your pliers, climber straps, safety belts and other items carry the Klein trade-mark—famous for quality "since 1857."

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The Klein Pocket Tool Guide showing the Klein line and containing useful tool information will be mailed on request.

Mathias KLEIN & Sons
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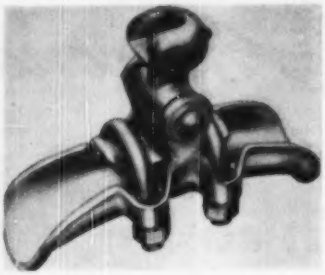

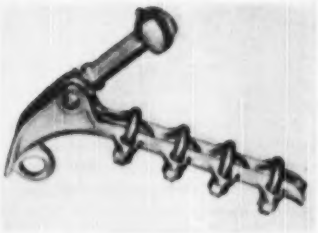

(116) The series 9500 suspension clamp (above) and the 5200 strain clamp (below) are in a new line designed for use on ACSR and all-aluminum conductors by the Brewer-Titchener Corp., Cortland, N. Y. Available in a wide range of sizes, these clamps eliminate the hysteresis and eddy current power losses caused my magnetic ferrous clamps on high-current transmission lines. They feature a non-magnetic body said to effectively break magnetic path around the conductor so that power losses are negligible, even on heavily loaded lines. General design resembles BTC drop-forged steel clamp

(117) The 2500 series is designed for areas where seeing task is critical; has a surface brightness of 0.13 to 0.38 candles per square inch within shielded zone. Made by Sunbeam Lighting Co., 777 E. 14th Place, Los Angeles 21, Calif., in 20- and 24-in. diameters, using 300- to 1,500-watt silvered-bowl lamps

PIONEERING *in Hydraulic* POWER –

The Pioneers - those who devoted their lives to the harnessing of one of nature's mightiest forces - water - contributed greatly to this nation's progress! For 75 years, we have built turbines for high, medium and low heads, many types of valves, hoists and gates, pumps, trash rack rakes and kindred hydraulic equipment. Put your problem up to us.

S. MORGAN SMITH Co.

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THE MAGNO-TRONIC FLUORESCENT STARTER

PROTECTS Fully automatic thermal relay with unusually long life that eliminates blinking lights and protects all auxiliary equipment.

SIMPLIFIES Replacement of worn-out lamp automatically restores closed circuit—replacement of starter unnecessary. No button to push.

REDUCES COSTS Magno-Tronic starters provide exact timing in the lamp electrode—preheating process preventing excessive loss of emission material thereby assuring the maximum in the useful life of a lamp. The established quality of this starter saves considerable time in maintenance and man hours required to repair and/or replace an inoperative lighting unit.

VERSATILE Will operate efficiently over an extended voltage under widely varying temperatures.

GUARANTEED FOR ONE YEAR

The (SP-15-20) for use with either 15 or 20 watt lamps
The (SP-30-40) for use with either 30 or 40 watt lamps
The (SP-100) for use with 100 watt lamps

Ask for descriptive literature

INDUSTRIAL ELECTRONICS CORP.

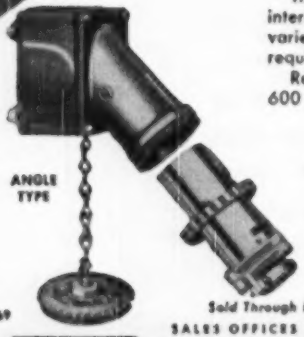
MAIN PLANT Newark 2, N. J.

R&S HEAVY DUTY RECEPTACLES AND PLUGS

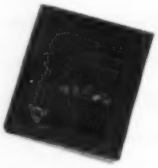
Many unique built-in features insure adequate safety factors, assure low maintenance, and allow ease of installation.

The high degree of standardization and interchangeability of parts provide a wide variety of types and sizes to meet every requirement.

Ratings from 30 to 400 amps., 250 and 600 volts.



VAPORTIGHT WATERTIGHT AND EXPLOSION-PROOF



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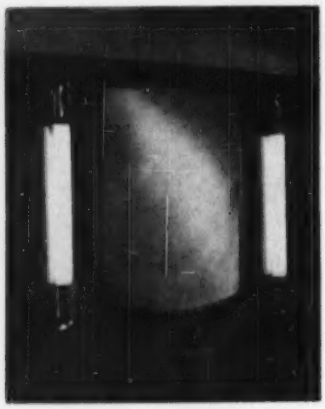

(118) For use alongside of bathroom mirrors, these new F fixtures have been introduced by Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18, N. Y. Each contains a single 14-watt F lamp; fits close to the wall to eliminate bulkiness and reflections. Available in two models, the R-114 equipped with switch and RO-114, with switch and convenience outlet. Slightly over 21 in. long, fixture can be used also under kitchen cabinets, over range

(119) A 375-watt photoflood lamp developed for home movie making has a narrower beam spread; permits use of four lamps simultaneously without exceeding capacity of most household circuits. Color temperature is 3,400° Kelvin; can be used for black and white and color pictures. Lamp has service life of four hours; is made by the General Electric lamp department, Nela Park, Cleveland 12, Ohio

(120) FIXTURES—A new series of incandescent luminaires for silver bowl lamps has been introduced by the Edwin F. Guth Co., 2615 Washington Ave., St. Louis 3, Mo. The series includes the Seelux, the Seelux Plus, Skoolux and concealed indirects; concentric louvers, semi-indirect and indirect.

(121) BENDER—A hydraulic, remotely controlled thin-wall conduit bender for 1¼-, 1½- and 2-in. sizes has been added by Blackhawk Mfg. Co., Milwaukee 1, Wis.

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10,000 sq. ft. of production space, which includes a modern building and new equipment is being added to the SUNBEAM plant. This symbolizes the spirit of cooperation we have had in the past and the greater lighting service we will render in the coming years.

10,000 square feet of added production facilities will mean more engineered lighting for schools, offices, stores, factories — for every commercial purpose. We owe our thanks to the architects, contractors, electrical engineers and our distributors who have made this expansion possible.

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BULLETINS ETC.

(122) TRANSFORMER DESIGN—Construction details of modern shell-form and core-form oil- and air-insulated power transformers are described in B-4142, a 24-page booklet available from Westinghouse Electric Corp., P.O. Box 2099, Pittsburgh 30, Pa.

(123) INDUSTRIAL LIGHTING—A selection guide describing 12 basic systems for general lighting for industry is offered by Benjamin Electric Mfg. Co., Des Plaines, Ill.

(124) DIMMERS—Powerstat light dimming equipment for schools is covered in an eight-page booklet prepared by Superior Electric Co., Hannon Ave., Bristol, Conn.

(125) CONNECTORS—Bulletin 206-A offered by W. N. Matthews Corp. lists and pictures all types of connectors made by that company.

(126) LUBRICATION—A condensed catalog of lubricating devices has been published by Trico Fuse Mfg. Co., 2948 N. 5th St., Milwaukee 12, Wis.

(127) PLASKON—A four-color booklet discussing properties, applications and techniques of molding Plaskon urea and melamine molding compounds has been published by the Plaskon Division, Libbey-Owens-Ford Glass Co., 2112-24 Sylvan Ave., Toledo 6, Ohio.

(128) LUGS—A catalog of electrical lugs, connectors and accessories has been issued by the Ilsco Copper Tube & Products Inc., Mariemont, Cincinnati 27, Ohio.

(129) WEDGES—A data sheet on Ismanco formed fiber wedges is offered by Insulation Manufacturers Corp., 565 W. Washington Blvd., Chicago 6, Ill.

(130) AIRPORT LIGHTING—A bulletin on its new fixed-focus high-intensity runway marker light is available from Line Material Co., airport lighting division, East Stroudsburg, Pa. This bulletin 49050 describes construction and application; includes diagrams, ordering information, a complete listing of CAA installation and equipment specifications.

(131) HEATERS—Industrial catalog (EC-62) and domestic catalog (EC-63) are available from Electromode Corp., 45 Crouch St., Rochester 3, N.Y.

(132) EQUIPMENT—An enlarged edition of its RM Handylog has been published by Locke Inc., P.O. Box 57, Baltimore 3, Md. This 99-page catalog lists power insulators, suspension hardware and pole line hardware for transmission, distribution lines and stations.

(132) OSCILLOGRAPHS—Applications, operations and features of multichannel recording oscillographs are discussed in a new bulletin from Consolidated Engineering Corp., 620 N. Lake Ave., Pasadena 4, Calif.

(134) BREAKER—The Ad-On multibreaker for home electrical circuits is described in Publication MS-24 of Cutler-Hammer Inc., 234 N. 12th St., Milwaukee 1, Wis.

(135) CLIPPERS—Electric hair clippers are listed in a new catalog prepared by the All-over Mfg. Co., Racine, Wis.

(136) RESTRICTIONS—The 1950 issue of "Truck and Trailer Size and Weight Restrictions" is available from the Four Wheel Drive Auto Co., Clintonville, Wis.

(137) HOLE DIGGERS—Operation characteristics, mechanical specifications, accessories and service for the Hugh B. Williams Mfg. Co. hole diggers are treated in a bulletin available from the distributor, Joslyn Pacific Co., 5100 District Blvd., Los Angeles, Calif.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
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* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.

Accuracy of Type FR-1 Recloser Assures Best Continuity of Service!

This rugged mechanical timer masterminds the General Electric FR-1 Automatic Recloser. Operating in air, its time-current characteristics remain exactly as published regardless of temperature, or viscosity changes of oil. You are assured of positive coordination—with breakers, reclosers in series, and with fuses.

Don't Lose Minutes of Protection While a Recloser Resets!

The FR-1 resets in a matter of seconds—instead of minutes—avoiding unnecessary fuse blowing and recloser lockouts from rapidly recurring faults. It holds service trips to a minimum during lightning and windstorms.

Picking Up the Load Is Easy!

With conventional operating function, manual reclosure is on time-delay. Furthermore, only G.E. includes the alternate "hold-closed" function—inrush currents can't lockout the recloser because it holds closed until these currents have subsided, then automatically resets for normal operation. This exclusive function also permits the use of more sectionalizing points and enables a saving in system investment.

Interrupting Ratings Are Realistic at Full Voltage!

The FR-1 performs smoothly at voltages from 2400 to 15,000. It is capable of clearing its maximum interrupting rating even at full voltage—your assurance of greater reliability.

No Problem with Load Growth!

No need to worry about load growth damaging the recloser. The FR-1 is self-protecting on overloads—withstands continuous current up to its minimum pickup rating—a feature which gives you time to plan system changes.

No Other Recloser combines these essential features. In addition the FR-1 gives you: choice of two operating functions—oil-blast interrupter—relay control of interrupter circuit—bushings interchangeable with those of modern G-E transformer—Thyrite protection for coils—conversion of ratings in service.

For a full story on this recloser including coordination data, write for bulletin GEA-4934. Address your nearest G-E Apparatus Sales Office or *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

953-50

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

"Ad-On" MULTI-BREAKER

TYPE MB-4 SERVICE AND LOAD CENTER

ADD CIRCUITS
Easily, Quickly At Low Cost

START WITH 4:

Basic circuit breaker unit provides 4 single pole, 1 double pole and 2 single pole, or 2 double pole circuits in combinations of 15, 20, 30, 40 or 50 ampere ratings.

ADD 4 MORE:

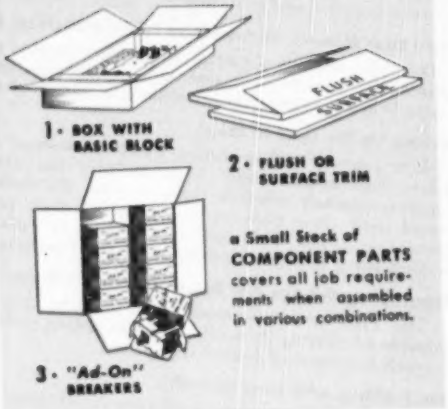
1, 2, 3, or 4 single pole circuit breaker units rated 15, 20 or 30 amperes are easily plugged in on basic block.

Coilless
Thermal Magnetic Multi-breaker

The basic **"Ad-On"** Multi-breaker unit provides four circuits—the *minimum* for a modern home. Even more important, it provides for easy addition of circuits *as they are needed*. Four off-the-shelf **"Ad-On"** breakers extend the range of the basic block in the required circuit pattern.

Architects, builders and contractors all know from experience that many electrical appliances are added after homes have been completed and lived in. With **"Ad-On"** breakers it's a simple matter to provide these circuits so necessary for better electrical living.

FLEXIBLE MERCHANDISING PLAN



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3. "Ad-On" BREAKERS

a Small Stock of **COMPONENT PARTS** covers all job requirements when assembled in various combinations.

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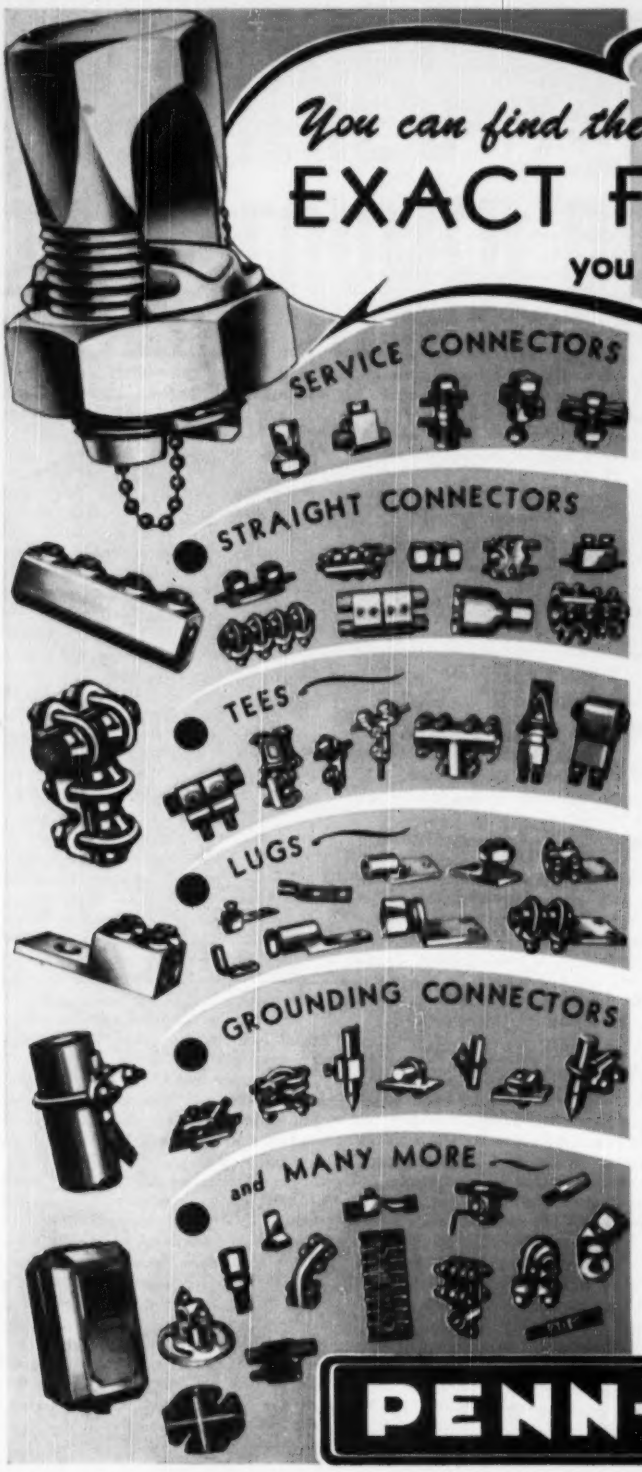

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ELECTRA'S HUSBAND

"IT'S funny the things you run into in this business," our guest was saying the other evening as we sat visiting. "When I was a youngster just fresh out of college, and I do mean fresh, things seemed so simple. But you learn, yes, you learn. Did I ever tell you about garbage disposers in San Francisco?"

"I heard you couldn't have them," said Electra. "But I never knew why. It seemed so silly."

"Not silly, just political," the guest went on. "It took the power of the press to get them in."

We both asked at once how that could be. Was it the plumbers union or the master plumbers association, or the board of health?"

"You are thinking of dishwashers," he said, "but I think that is straightened out now. No, it was the garbage hauling association, a very tight and important political factor in that city's politics. Its objections were very obscure but they seemed to be back of all the blocks put on the sale of disposers in the town.

"You'd go for a permit to install one and get the darndest run around, ending up nowhere. Manufacturers men would plead with the city officials and be yessed and put off. Dealers got the same treatment. I think sometimes the only things that got chewed up were the permits, never the garbage. The whole industry was getting nowhere fast and yet could not put its finger on the cause."

"What brought it out then?" we asked our friend.

"A newspaper man—the power of the press."

"I'm surprised you got a newspaper man to espouse a cause for the electrical industry," I told him.

"Oh he didn't give a darn about the electrical industry. He had been reading the ads in the home and garden magazines. He had seen disposers demonstrated. And he wanted one in the new home he was building.

"It was then that he ran into the same kind of inexplicable delays that had always plagued us. But the thing aroused both his curiosity and his ire and when you get those two forces working in a newspaper man you get action."

"What did he do?"

"Plenty. First he started an investigation of his own. Then his fellow reporters took up the scent. Columnists began to comment on the peculiar relationship between the big garbage trust and this illegal restraint of trade and got very close to the political tie-ins at the city hall. The thing began to smell, and I don't mean garbage.

"You know, it was the funniest thing. All of a sudden there wasn't any opposition at all. Why permits went through quick as a flash. Remarkable!"

GARBAGE DISPOSERS IN SAN FRANCISCO

"You mean a person can buy one now and have it installed easily?"

"Yes indeed. What is much more interesting though is that whole new communities are putting them in every house. These disposers dispose of one of the big problems of growing communities — disposal of garbage, and with garbage the health hazards of flies and rats. When the public fully wakes up to this better means of handling a dirty problem, it won't tolerate the old garbage can any longer. Or the pickup trucks parading with flies as escort squadrons through the streets."

ELECTRA'S enthusiasm for an electric sink has been dampened. One of the neighbors did it by over-demonstrating her garbage disposal unit. She put a coke bottle into it. The resultant awesome racket and vibration convinced Electra that an earthquake had hit and she almost ran out into the street. Asked afterward why she chose that method of disposing of an empty bottle, the neighbor said, "Well the salesman did it when he showed me how the machine would chew up anything."

I told the story to a group of sales managers one day at lunch and it elicited a number of pertinent comments on the foolhardiness of too much demonstration. As might be expected there were a number of personal experience stories to back up the general opinion.

"Remember how we used to prove the durability and permanence of the enamel finish on refrigerators?" Bob L. asked. "You took a broom handle and beat hell out of the top or the door. The customer was usually impressed. But if she walked back to that particular box fifteen minutes later, likely as not a whole chunk of enamel would have been peeled right off."

"Some of you will remember that one of the early refrigerators had a plastic tray that fitted into a little rack on the inside of the door," remarked Robbie R. "It was just another good talking point. No less a sales genius than Ray C. was demonstrating a box one day and he pointed up his pitch by showing that the plastic tray was unbreakable. He tossed the tray onto the floor. Well 1926 plastic was not 1949 plastic and the tray literally exploded into a thousand pieces. His lady prospect walked out on him."

"Funniest demonstration I ever saw was put on by the district rep for the XYZ Folding Bed Company when I was a salesman at Sterling's," Bert R. said. "He had a large part of the sales force gathered early one morning for a sales talk on the XYZ combination davenport-bed. " 'See, it opens like a spring watch case,' he said, giving the frame a tug.

"Well nothing happened. So he jerked harder. Then he really laid into it. He pulled and hauled and sweat and swore and tugged. Finally with a big heave he opened the springs out.

" 'This one was kinda stuck a little,' he said with a tone of embarrassment. 'But let me show you the kind of steel we put into this bed. It's really built to stand anything.'

"So he climbed up onto the head of the thing and started walking on the springs. Maybe he thought he ought to show us something special because of the trouble in opening up the bed. Anyhow, when he reached the middle he started jumping up and down. On the second bounce he went right through the springs onto the floor. He was ten minutes extricating himself and he tore his pants leg too. I never see one of those combination davenport-bed affairs but what I think of that guy."

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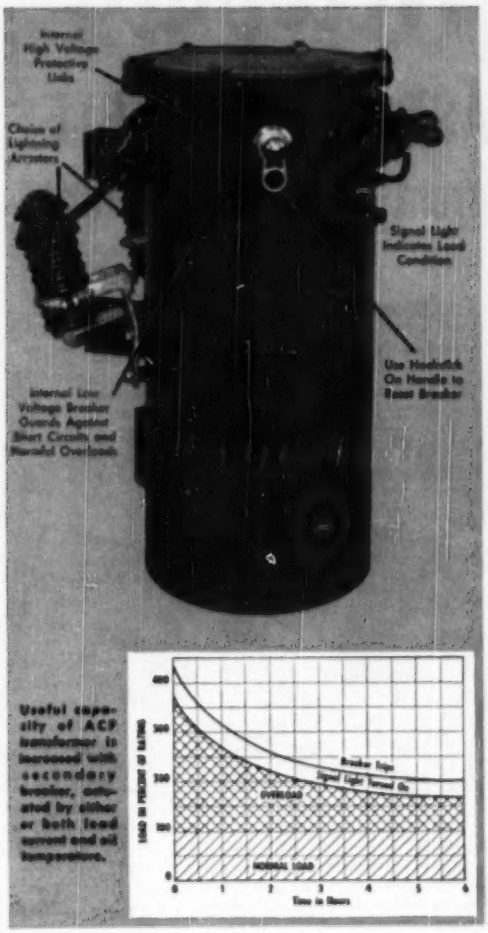
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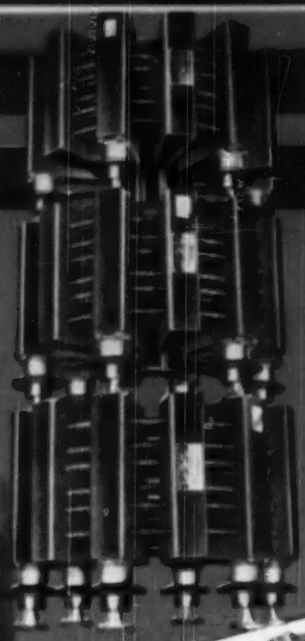

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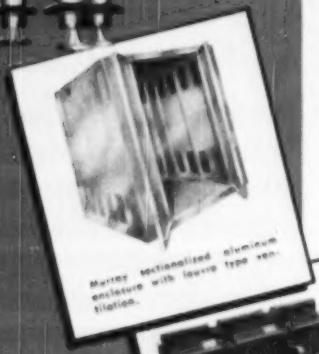
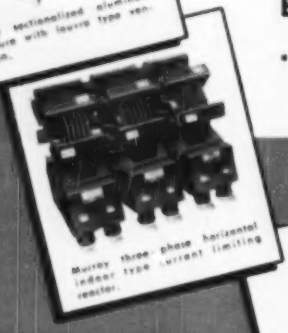


Murray sectionalized aluminum enclosure with louvre type ventilation.



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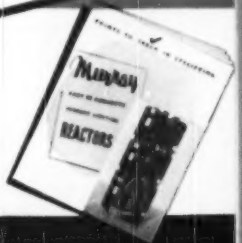


SERVICE ENTRANCE & METER EQUIPMENT • MAGNETIC CIRCUIT BREAKERS
SWITCHES • CURRENT LIMITING REACTORS • CROWS NEST AERIAL LADDERS

JANUARY, 1950 Vol. 104, No. 1

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

WHOSE WATER IS IT?

IN a suit filed in the Federal District Court at Denver in the early fall of 1949, naming the United States as plaintiff, the Reclamation Bureau and the Department of the Interior are threatening the rights of every person and corporation now using or seeking to use water out of the Colorado River and its tributaries in the state of Colorado. They would divest the individual states and their courts of their present power to determine rights to water according to congressional acts, federal court decisions, state constitutions, laws, usages and customs.

Should the action be successful—and some of the ablest irrigation and river lawyers in the Rocky Mountain West are convinced that the plaintiff will prevail—then a government bureau, established originally by congressional act to aid the farmers of the West to reclaim lands by means of artificial irrigation, will have annulled the provisions of all existing laws and decisions on water rights. The banner of bureaucratic government will have been planted high atop the Colorado Rockies.

Should the Reclamation Bureau succeed in federal courts in adjudicating all claims to the use of water and subjecting vested rights under state decrees to the priority of the claims of the bureau itself, then the logical move will be to extend the subjugation of all water users in every other Western state to the control of a federal bureau.

Many attempts to assume control of Western rivers on some theory of federal ownership have been recorded but in every instance the basic doctrine of state and local control has prevailed in the past. The jurisdiction of the states has been recognized. The suit in question is brought under a more subtle guise than any prior effort, however.

The state courts are open and functioning and the legal procedure for the establishment of rights to use water is extended to every claimant on every stream in the state. The Bureau of Reclamation has recognized this situation heretofore. It has consistently followed the procedure under state laws by filing claims, including several for the very water it now seeks to take under the novel theory of this pending suit, and, in at least one case, has already secured a decree from a Colorado court. Yet, it now contends that the United States is not bound by such filing or even by the decree in its favor. The plaintiff now asserts that no state court can enter a decree involving the rights or property of the United States. And since it claims to own the water it seeks to have adjudicated, it has gone into a federal court in the hope of upsetting an economy which has been developing for nearly a century.

One must review the history of irrigation growth in the arid West in order to realize the gravity of the threat which faces the water users along the Colorado. When miners first sought precious metals in the early settlement of California, they found that gold bearing ledges were not always located beside natural streams. Farming was likewise limited by existing laws to the river bottoms proper. As early as 1866 the Congress sought to remove these handicaps and to encourage the washing of placer gold from distant hillsides and to enable farmers to irrigate lands in other watersheds than those in which the streams flowed. Necessity dictated the laws which were enacted. These recognized the right to use in perpetuity the amounts of water which originally were diverted from a stream and applied to a beneficial use. This included the right to carry water out of its natural watershed and to use it where it was needed.

As the West continued its growth and new states were admitted into the Union, each state constitution provided, generally, that the waters of the natural streams in such state were dedicated to the use of the public and became *publici juris*. Under this doctrine each Western state then set up its separate method of procedure for the distribution of water and established state officials and agencies to determine and administer relative rights to the use of the river flows. In Colorado, district courts were empowered to determine the rights to use water with reference to the dates of the original efforts to divert it and the diligence with which individual projects were completed. Since then, whether by virtue of certification by state agents or under decrees of courts, water users have used and possessed rights to water which are as sacred and as valid as the titles to the lands on which the water is used.

Through the years attempts have been made by different agencies of the government either to override or sidestep the provisions of the state laws and Constitution. In every instance, where the question has reached the Supreme Court of the United States, that tribunal has consistently held that the control and administration of the waters of the rivers of the semi-arid West are subject to state laws, customs and usages. A monumental decision by Justice Brewer in the case of Colorado vs. Kansas announced this doctrine.

Every contention that the United States or its departments can divest the states of this power has been denied. It has been held that the government is in the position of a mortgagee under the Reclamation law when it advances funds for the construction of a project. These advances are to be repaid.

The United States is not the real party in interest when the title to water is involved, because the individual water user or consumer is actually and ultimately the owner of the water. When the Reclamation Bureau seeks

the right to divert water in any state it must do so according to the laws of that state.

In the case now pending the government has already expended more than $150,000,000 on the Colorado-Big Thompson project. This will carry water out of the Colorado River from the western to the eastern slope of Colorado through the 13-mile Adams tunnel under the continental divide, emerging at Estes Park in the Rocky Mountain National Park.

At the eastern portal of the tunnel the water will first be used to develop enormous quantities of hydroelectric power and then will be permitted to flow through the Sugar Bowl of northeastern Colorado to supplement existing irrigation supplies. Dams are being constructed on the western slope which will impound water for the protection of western Colorado irrigators and for domestic needs. The Granby Dam will impound water which will be lifted by electric pumping into Grand Lake and then will be permitted to flow through the Adams tunnel to eastern Colorado.

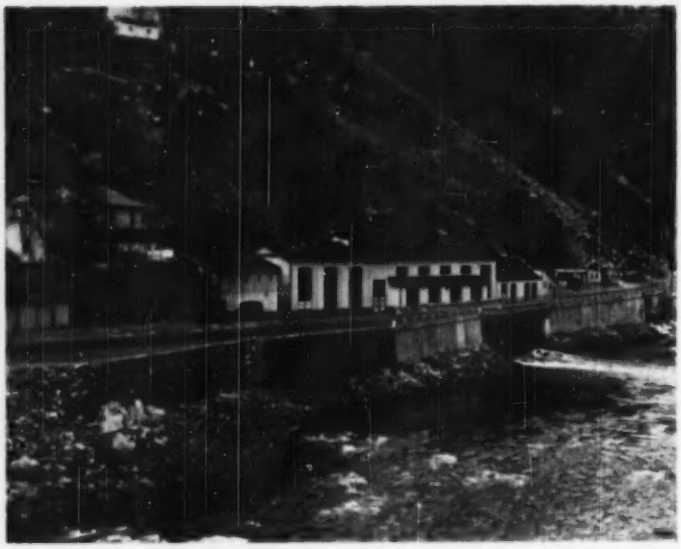
A portion of the power developed on the eastern slope will be carried back over the mountains to pump more water into Grand Lake to flow easterly through the Adams tunnel so as to develop more power; thereby accomplishing the impossible—"perpetual motion." The hydroelectric power will assure industrial development in northern and eastern Colorado while the supplemental irrigation supply will enforce agricultural prosperity for one of the West's foremost farming areas.

No one questions the wisdom or the value of the Colorado-Big Thompson project. It is only when a bureau seeks to control the flow of the river and all its tributaries and to subject the rights of more than a thousand individual claimants to the operation of one project, that they object.

Under the complaint, eight defendants, only, are named. It is admitted that more than a thousand other water users are involved but it is averred that the eight named defendants represent all others. The government attorneys have said that they propose to conduct their adjudication proceedings in federal courts according to state laws.

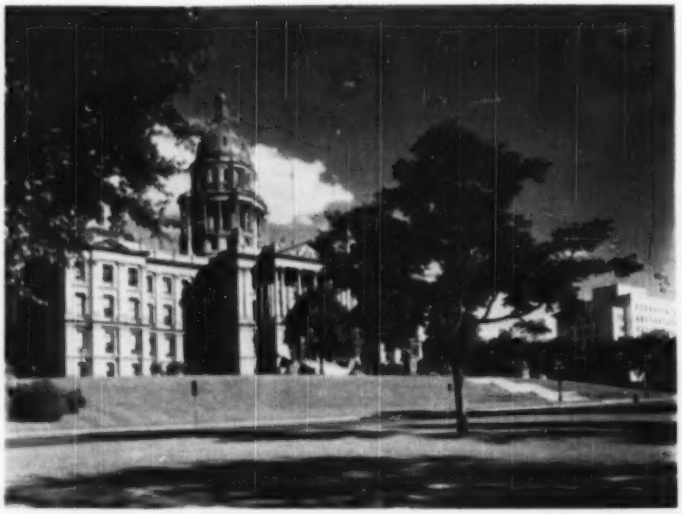
It should be remembered that under the Colorado procedure each claimant to the use of water is considered as operating as a separate claimant. Each water user is in competition with every other where water is scarce and insufficient to satisfy all users. Each is served with process so that he may appear in court to protect his interests. Necessarily, the conditions under which each homesteader operates is distinct from those under which every other water user works. When a claim is allowed by the court it is given a priority date and number for a certain named quantity of water. When a thousand persons holding or asserting rights to specified quantities of water under state court decree—some three-quarters of a century old in age—are not even before the court, it can hardly be established that a readjudication of the rights of all these persons in their absence, by the court of another jurisdiction, without service of process or any opportunity to be heard, constitutes due process of law.

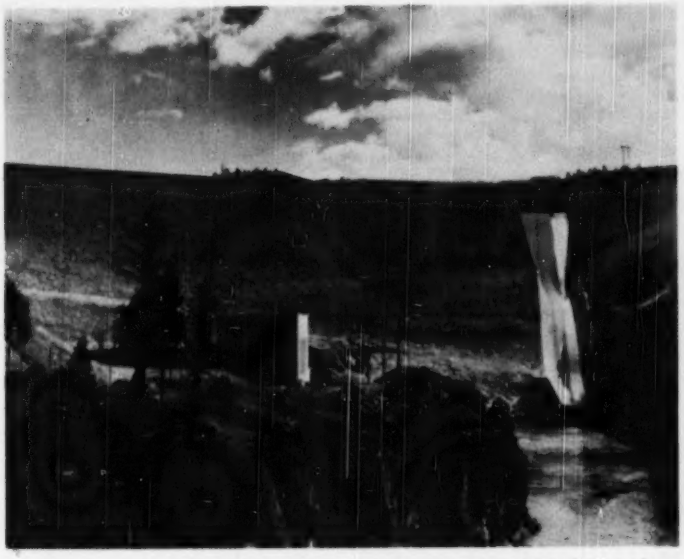
The excuse for the suit in the Colorado federal court is Senate Document No. 80, which was enacted into law in 1937. That instrument sets up a procedure to be followed by the Reclamation Bureau with respect to the administration of the river flow of the



Pending federal suit jeopardizes Shoshone plant Colorado River water rights

Will functions of state government be usurped by federal agencies and will state buildings like the capitol building in Denver no longer be needed?





Interior is suing for water for Green Mountain and other USBR hydro plants

Colorado. The government now says this act calls for interpretation.

If an interpretation is given to Senate Document No. 80 in conformity with the prayer of the complaint, then the Reclamation Bureau will take over the control and allocation of the waters of the river. This would be done in such a manner as to preclude the various defendants from the enjoyment of the rights asserted under their decrees already acquired as well as under those sought in state court adjudications now pending and to be commenced as the development of each section justifies.

Defendants

The named defendants include the Northern Colorado Water Conservancy District, which is located on the eastern slope where it is in a position to take and to enjoy all the benefits of the water sought under the complaint to the exclusion of the rights of water users on the western slope; two defendants are located on the main river in western Colorado and at least one of them appears to be giving comfort and support to the government; the cities of Denver and Colorado Springs, which claim rights to water that will furnish reason and encouragement for future growth; the Moffat Tunnel Water and Development Co., a corporation, which proposes to carry water through the Moffat Tunnel for use in eastern Colorado; the South Platte Water Users Assn., which includes a group of counties on the South Platte river on the eastern slope whose water users claim equal rights with the people of the favored Northern Colorado Conservancy District; and the Public Service Company of Colorado, a private utility, with unquestioned priorities and rights, which proposes to continue to develop hydroelectric power. The last named utility and two public districts have filed answers.

Motions to dismiss the complaint have been filed on behalf of five of the named defendants. Among the questions of law which must be determined before a trial on the merits, are contentions that the United States has no capacity to sue and that the action in the federal court is a subterfuge to invoke federal jurisdiction in order to evade the laws of Colorado regarding the exclusive jurisdiction of the state courts in the adjudication of claims to water.

It is said that the people of The Northern Colorado Water Conservancy District, who are intended to benefit by using the water claimed by the United States after it has developed hydroelectric power, are the real parties in interest. These persons should be in the state courts proving their claims instead of permitting Uncle Sam to do it for them in a federal court.

It is asserted by the defendants that Senate Document No. 80 does not concern the United States on a national basis and involves only matters which are local and limited in their scope and that the document cannot replace existing state laws. The motions point to the fact that the Bureau of Reclamation has claimed the same water in state courts and has acquired a decree under Colorado laws in at least one instance.

Defendants say that the federal court has no jurisdiction and under the Colorado laws a full, adequate and complete procedure has been established for years and is in operation for the judicial settlement of relative claims to water. Therefore, there is no

Local government as exemplified by Denver's City and County building might cease to exist unless activities of some of our federal bureaus are curtailed

need for the exercise of federal jurisdiction.

It is suggested that the United States is really acting on behalf of one of its agencies for the benefit of persons who, as the real parties in interest, have recourse to state courts and laws.

They deny that the eight named defendants can, or do, represent all persons not named as defendants and that the suit would not settle anything.

U. S. Status Questioned

The motions point out that the United States and its departments, agencies, representatives and officials occupy the exact status with respect to rights to use water as any other individual and that the adjudication of such claims is within the exclusive jurisdiction of state courts. It is charged that the complaint is an effort to attack decrees of state courts, which cannot now be questioned because of statutes of limitations. The government is attempting to readjudicate rights long since crystallized under the laws and the Constitution of Colorado.

It is next charged that the action constitutes an attempt to enlarge the laws authorizing the operation of the Bureau of Reclamation and confer upon it rights, powers and privileges not contained in the law establishing the bureau and amendments thereof. In fact, it is claimed that the original purpose of the Reclamation Act would be changed if the plaintiff were successful and that the Bureau of Reclamation, which is a mere investor with right to repayment, would become a commercial enterpriser under an unjustified construction of the Reclamation Act.

An angle which is causing more speculation perhaps than any other involves what may result from the proposed adjudication in the federal court if the claims of the government for enormous quantities of water to be used in the development of hydroelectric power are allowed. This thinking stems from the fact that most of the water users already holding decrees and the remaining thousand claimants mentioned in the complaint propose to use the water for irrigation. Conceivably all of these claims might be subjected to the government for the development of hydroelectric power.

It is feared by those who oppose the government that in spite of the Colorado Constitution which classes uses of water in the order of domestic, irrigation and manufacturing, that the third of these classes may become paramount. The certain result would be to the injury of irrigation users. It will be physically impossible for users of water on the western slope as well as claimants, such as the cities of Denver and Colorado Springs and the South Platte River Water Users on the eastern slope, to enjoy the water which they need if it is to be carried northward through the Adams tunnel first for the development of power and then is permitted to flow through the Northern Colorado Conservancy District for irrigation purposes. The fear is that the emphasis on the development of hydroelectric power may render the claims of farmers subservient to power.

A definite clash is certain under the answer filed by the Public Service Company of Colorado which has long been developing hydroelectric power on the westren slope. It claims rights which are old enough and so well established under state laws that any interference with its functioning will probably constitute a violation of constitutional rights. The answer, among other things, charges that the Bureau of Reclamation which was charged with the responsibility of constructing and operating the Colorado-Big Thompson project acted without authority or right under the Constitution of the United States or of any Act of Congress, or any other authority, by wholly departing from the plans and purposes contained in Senate Document No. 80. It is said that the project authorized by the Congress was primarily intended as a reclamation project for the trans-mountain diversion of water from the western slope for the irrigation of lands on the eastern slope of the state.

Power Claimed Incidental

The answer charges that the generation of hydroelectric energy was incidental to the irrigation purposes which were basic. It is asserted that the bureau, although without authority so to do, plans to construct many transmission lines for the carriage of hydroelectric power which will duplicate the existing lines of the Public Service Company in northern Colorado. The bureau is alleged to be seeking an appropriation from the Congress for approximately $3,000,000 to carry on this duplication of transmission lines. The answer of the private utility further charges that while it operates many plants for the generation of power in northern Colorado, the Bureau of Reclamation is engaged in the operation of a utility system involving the generation, transmission and commercial distribution of electricity which constitutes a program which will compete with the defendant company and result in substantial loss and injury to the company. This competition will result in the abandonment of many generating and transmission facilities of the company so as to constitute a taking of the property of the company without just or any compensation and without due process of law, all in violation of Article V of the Amendments to the Constitution of the United States.

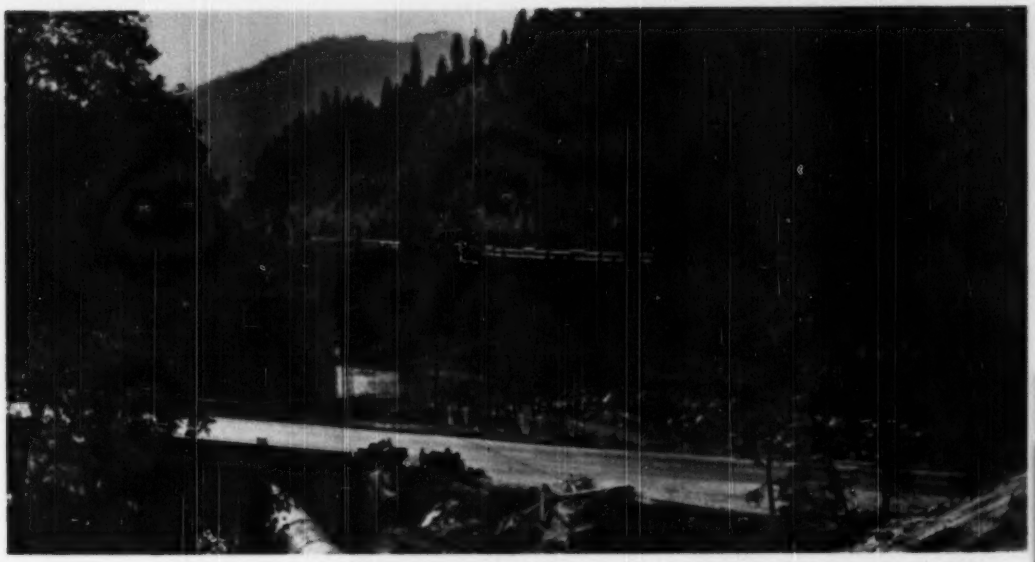
It is then alleged that the Congress of the United States has no constitutional authority to authorize the Bureau of Reclamation to undertake the operation of a utility system involving the generation, transmission and commercial distribution of electricity within the defendant company's service area.

Interstate Compacts Cited

Finally, it is suggested that the federal court is in no position to adjudicate rights to water within the state of Colorado when all of the water involved has been the subject of two interstate compacts—the first between all seven of the states bordering the Colorado and the second, which is really supplemental thereto, which involves the four upper basin states on the river. By the last named agreement an allocation of all the water belonging to the upper basin was accomplished and Colorado was assigned something more than three million acre feet. These compacts were ratified by act of Congress and signed by the president after all the states to each agreement had approved them by legislative action and the signatures of the separate governors.

It is contended that the government agreed to the diversion of water among the states and thereby divested the federal government of any right or power to claim the control or the right to distribute the separate quotas granted to the separate states under the terms of the compact. While the case is pending and undecided in the federal court, state courts are going forward with the adjudication of rights to water in districts involved in the government's complaint. It appears certain now that decrees will be entered in many instances and the government is not now a party in those cases since its withdrawals.

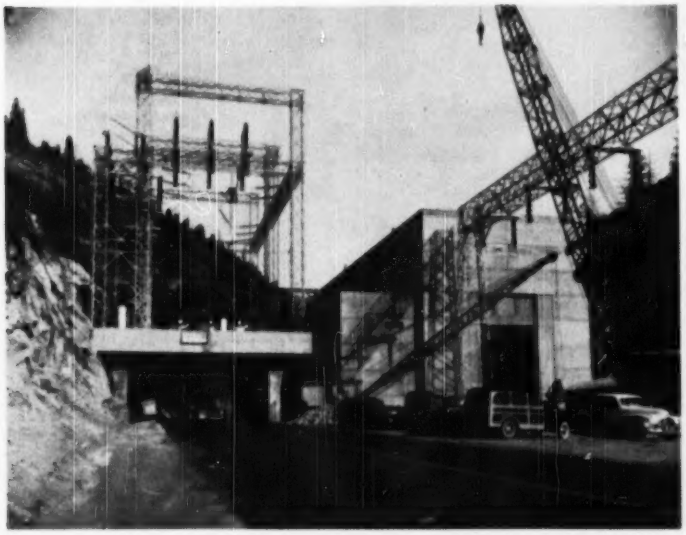
Some intriguing legal questions are going to be determined in the various courts. All students of water law will watch with interest the decrees which will be forthcoming because of their certain influence upon the future economy of Colorado and, of necessity, of all the Western states. Obviously the main question involves further centralization of government and the substitution of bureaucracy for a representative form with state and local participation in local affairs removed from the picture.



Cresta is one of two new plants with total capacity of 210,000 kva. built by PG and E on Feather River. Train is Western Pacific's streamlined Zephyr

NEW HYDRO RESERVES

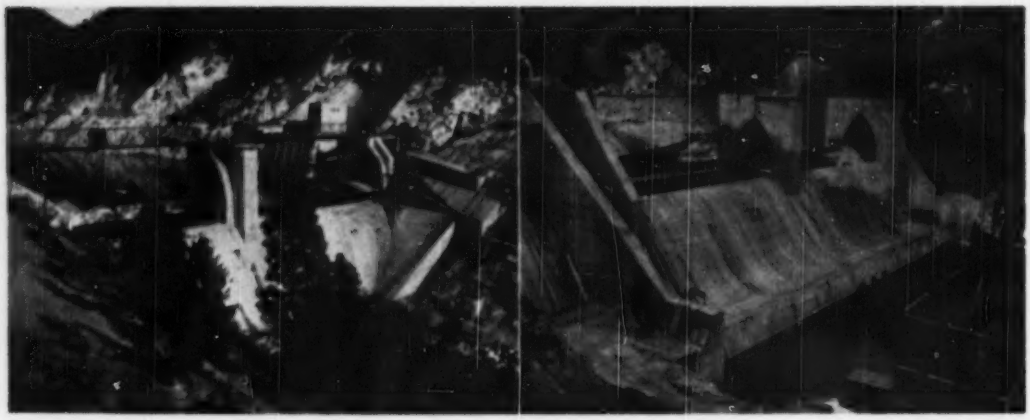
Switchrack, transformers and oil circuit breakers were located on concrete structure over state highway at Rock Creek power house because of narrow canyon. Penstocks pass beneath highway and tracks of Western Pacific Railroad



TWO new hydro plants on the North Fork of the Feather River, costing $61,800,000, are nearing completion in Pacific Gas and Electric Co.'s immense program of new steam and hydro generation to keep abreast of rapid load growth and provide adequate reserves. The new plants, Cresta and Rock Creek, located thirty to forty miles northeast of Oroville, Calif., will have a combined capacity of 201,000 kva. For an average water year the two plants will have total generation of 812,000,000 kwh.; for a full water year, 1,113,000,000 kwh. Cresta is practically completed, the first of two generators having gone on the line Nov. 23, 1949. Rock Creek is scheduled for February 1950. Since flow of the river is regulated by existing plants, with storage in excess of one and one-third million acre-feet, it was possible to utilize the fall in two short sections of the Feather River by low diversion dams, tunnels and comparatively low head plants. Engineering data will be found in the accompanying table.

Concrete gravity type dams for both developments are low weir-type structures with two drum gates for primary water level control. In addition a radial gate and a sluiceway will be provided at one end of each dam. Three 8-ft. diameter sluice gates are to be installed in the lower portion of each dam.

The Cresta tunnel, approximately 21,558 ft. long, consists of 2,951 ft. of 27-ft. diameter, 974 ft. of 19-ft. diameter round tunnel, including 518 ft. of steel-lined tunnel and 44 ft. of steel-lined sandtrap and transition,



Cresta and Rock Creek spillway-type dams divert regulated flow of river through tunnels to plants of same names

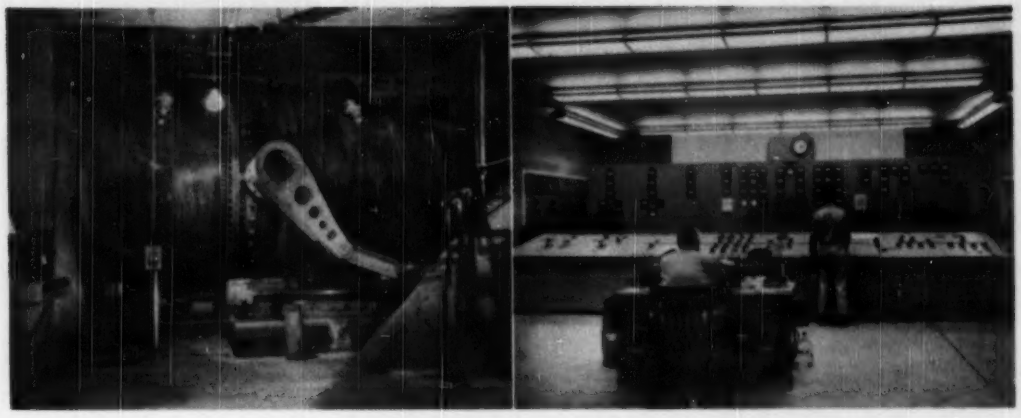
16,966 ft. of 26-ft. horseshoe tunnel and 667 ft. of 15½-ft. flattened horseshoe auxiliary tunnel added to the upstream portion of the main tunnel to provide temporary river diversion.

The Rock Creek tunnel consists of 34,113 ft. of 25-ft. diameter horseshoe tunnel section. Both tunnels are in granite formations. The Cresta tunnel required little timber support and concrete lining, while the Rock Creek tunnel required a large amount of support and lining.

The Cresta surge chamber is of the conventional differential head type located such that the top is above ground. A 19-ft. lateral tunnel, 154 ft. long, connects the bottom of the surge chamber to the 26-ft. main tunnel. Because of geological conditions, the Rock Creek development will have a subterranean surge chamber located directly above the tunnel. A 9½x11-ft. tunnel, 784 ft. long, will provide access

Information on Cresta Rock Creek Developments

ITEM		Cresta	Rock Creek
General			
Static head	ft.	290	535
Effective head	ft.	254	481
Flow (peak)	cfs.	3,500	3,000
Plant rating	kva.	75,000	126,000
Diversion Dam			
Type		concrete gravity	concrete gravity
Approx. height	ft.	152	178
Approx. length	ft.	384	562
Spillway capacity	cfs.	120,000	120,000
Storage capacity	acre-ft.	4,300	4,700
Tunnels			
Length	ft.	20,891	34,113
Size (unlined)		26 x 27 ft. horseshoe	25 ft. horseshoe
Surge Chamber		differential head	(subterranean)
Type		16 ft. dia.	differential head
Size: riser		46 ft. dia. x 125 ft.	12 ft. dia.
chamber			55 ft. and 46 ft. dia. x 131 ft.
Penstock Pipes		2	2
Number		800 ft. ea.	710 ft. ea.
Length		12 ft.	10 ft. 6 in. to 12 ft.
Size		½ in. to 15/16 in.	½ in. to 1 3/16 in.
Thickness (shell)			
Transformers		4	7
Number		single phase, 60 cycle	same
Type		self cooled, oil filled	21,000
Capacity	kva.	25,000	13,800
Low Voltage		11,500	same
High voltage		138,600/240,000 Y	
Turbines and Generators			
No. of turbines (vertical shaft reaction)		2	2
Horsepower per turbine		46,500	73,500
Speed	r.p.m.	180	240
Capacity per generator	kva.	37,500	63,000
Power factor (for designed max. efficiency	%	90	90
Generator voltage		11,500	13,800
Transmission voltage		220,000	220,000



Automatic closing penstock butterfly valve (left). Right view shows fluorescent lighting for the main control room

to the subterranean dome over the surge chamber. This surge chamber is also of the differential head type.

Penstocks

Tunnels for both developments will each discharge into twin steel penstocks. At the upper end of each penstock a butterfly shut-off valve will be installed. Cresta penstocks pass under the state highway by means of a culvert. Rock Creek penstocks will pass under the highway as well as tracks of the Western Pacific Railroad. Passage under both is by means of a 498-ft. tunnel filled with concrete to encase penstock pipes.

Power Houses

Both power houses are located between the state highway and the Feather River. At Rock Creek the highway had to be relocated to a position higher in elevation and farther from the river to make room for the building. Because of the narrow river canyon and lack of available room, a concrete structure was constructed adjacent to the power house building, which bridges the penstock tunnel portal, carries highway traffic on the lower deck, and supports the switch structures, transformers and oil circuit breakers on the top deck.

Electrical Features

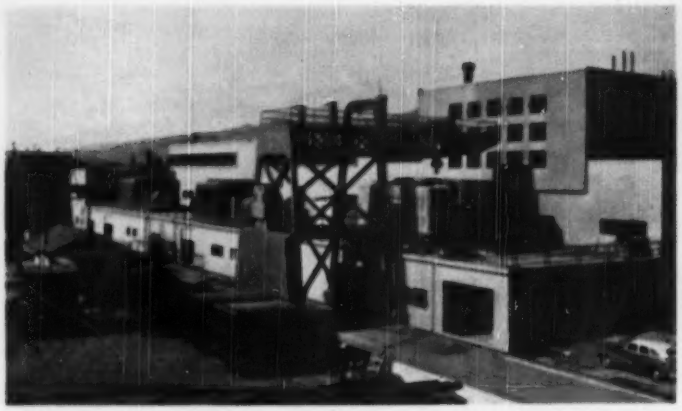
Electrical layout of the plants follows PG and E's established practice. Exciters are direct-connected with a spare motor-driven exciter for each plant. Generator leads are carried in a metal-enclosed separated-phase bus to a main and transfer bus provided with a paralleling breaker. Low-voltage breakers are of the compressed air type, supplied by Westingnouse. On-

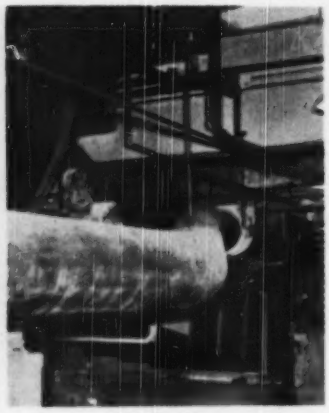
Cresta power plant interior showing one of the two 37,500-kva. generators

transformer bank at Cresta and two at Rock Creek, each with spare, step up from generator voltage to 220 kv. for transmission. A new 30-mile, 220-kv. line was built down the canyon to Oroville. From here a new circuit was strung in an existing tower position to Bellota substation in the northern end of the San Joaquin Valley, a distance of 111 miles.

Suppliers of major items of equipment were: Cresta: turbines, Pelton Water Wheel Co.; governors, cabinet-type Woodward; generators, General Electric Co.; main transformers, Allis-Chalmers; main oil circuit breakers, Pacific Electric Mfg. Co. Rock Creek: turbines, Newport News & Shipbuilding Co.; governors, cabinet-type Woodward; generators, Westinghouse; main transformers, General Electric Co.; main oil circuit breakers, Pacific Electric Mfg. Co.

Unlike some other West Coast utilities, PG and E designs its own hydro plants, this work being under the supervision of I. C. Steele, vice-president and chief engineer. All construction was contracted, with supervision under O. W. Peterson, engineer of construction. Contractors included: Morrison-Knudsen, The Arundel Corp. & L. E. Dixon Co., Walsh Construction Co., T. E. Connolly, Consolidated Western Steel Co., and the American Bridge Co. Electrical work at both plants was contracted to Wismer & Becker of Sacramento.





Burbank Builds Low-Cost Steam Plant

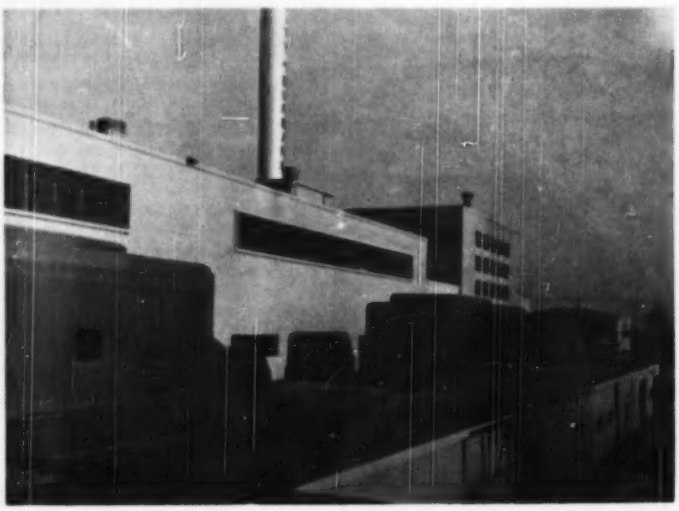
J. B. Johnson
Chief Mechanical Engineer

TYPICAL of possibilities in attaining low unit costs in a modern, relatively small steam plant with good economy is the new 20,000-kw. unit recently placed in operation by the Public Service Department of the City of Burbank, Calif. Semi-outdoor construction and use of a standard ASME-AIEE turbine-generator contributed to the low unit cost of $130 per kw. for the plant. The new unit constitutes the third at the city's steam-electric station, doubling previous capacity. The first 10,000-kw. unit was placed in operation in October 1941; a second similar unit in July 1943. Both were of semi-outdoor type. Satisfactory experience with the original units led to choice of the same type of construction for the new unit. Addition of the third unit, which brings plant capacity to 40,000 kw., does not provide adequate reserve to meet the growing load, so that a fourth unit should soon be constructed.

Burbank has a contract with the federal government for Hoover hydro power, but this provides for only 5,000 kw. Generators in the Burbank plant are interconnected with, and operate in parallel with, those of the City of Los Angeles and the City of Glendale. The system operates on a power interchange basis to the mutual advantage of all plants in the system.

The new unit is a 20,000-kw. Allis-Chalmers single-flow turbine, with direct connected generator and exciter, designed to operate at a steam pressure of 850 psig. and temperature of 900° F. The two original units are interconnected and operate at 625 psig. steam pressure and 825° F. temperature. Steam is supplied by a single Combustion Engineering Co's type U-V boiler, rated at 215,000 lb. of steam per hour. The boiler was installed by the R. L. Johnson Corp., and is designed to burn either natural gas or fuel oil. The steam generator includes a regenerative type Ljungstrom air preheater and forced- and induced-draft Sturtevant fans.

The new unit will not be connected to existing units one and two, except for secondary pipe lines and electrical control, and will not be equipped with a stand-by boiler. It was the consensus of engineers' opinions that a boiler can be made as reliable for continuous operation as a turbine. A single unit



Features at Burbank include recycling hot air ducts to prevent condensation in air preheater, shown at upper right

consisting of one turbine and one boiler lends itself to greater simplicity in design and has less complications in valves and piping, all of which tends towards greater reliability in operation. A deviation from older practice in blowing soot from the boiler tubes has been made, in that highly compressed air will be used in place of steam. In this equipment the air is delivered to the soot blowers at 250 psi. Each blower is powered by air and is also pneumatically controlled in sequence by an automatic timing device which can be manually adjusted. The success of this method of soot blowing is yet to be determined.

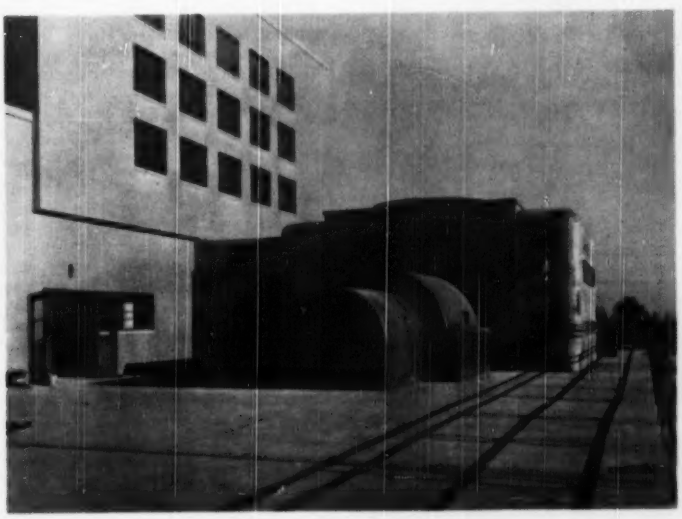
The practice of using all-electric motor-driven auxiliaries has been followed in this plant, the only exception being a mechanical-drive steam turbine which drives the spare high-pressure fuel oil pump. A 250-psi. steam auxiliary system has been installed for driving the mechanical turbine; also for heating fuel oil.

The plant was designed as a semi-outdoor type, as stated, this design being dictated largely by the precedents established by units one and two and the substantial saving in building costs. A further saving was made in overhead crane costs as the gantry cantilever crane serving the original plant also serves the new unit.

In the new unit fans are outside, the boiler is under the main buildng roof, and the steam turbine is housed separately in a steel housing with demountable roof which is removed by the crane when necessary for large overhead operations on the turbine. Minor repairs and inspection, which do not require a lift of more than 2,500 lb., can be effected without removing the roof by the use of a small auxiliary crane built into the roof of the steel housing.

The main condenser has 18,000 sq. ft. of surface, and was supplied and installed by the Elliott Co. It is supported directly under the turbine exhaust on spring supports and is rigidly bolted to the exhaust flange of the turbine. Cooling water is circulated through the tubes and over a Fluor mechanical draft-type cooling tower by one 20,000-gpm. circulating centrifugal pump made by Ingersoll-Rand Co., and one smaller pump for low loads. Make-up water is treated in zeolite softeners and raw water is normally supplied by a well near the plant with an emergency connection to the regular city water supply system. Close attention to composition and conditioning of water in the cooling system has resulted in unusually long life of condenser tubes. However, maintenance of the cooling towers has been found to be a considerable item in plant operation. It seems that a water satisfactory from the standpoint of condenser tube life may not be so satisfactory for the cooling towers. This problem is receiving further attention.

Boiler make-up water will be supplied by evaporators in the original plant as this quantity is expected to be less than one-half of one per cent due to the saving of soot-blowing steam. It is planned to equip the new unit with demineralizers of the anion-cation type in the near future as it has been found that evaporator make-up does not eliminate silica carry-over. The evaporator vapor has also been found to carry a great amount of carbon dioxide which the deaerator does not eliminate.



The forced- and induced-draft fans are each driven by a two-speed induction motor and are equipped with adjustable vanes at the fan inlets. Regulation of combustion air is effected by automatic control of the inlet vanes in combination with electric control of motor speeds. This control is of a metering type and is metered by a large orifice placed in the hot-air duct under the boiler. Provision has been made to prevent condensation in the air preheater at low loads by the installation of recycling hot-air ducts which return a portion of the hot air back to the forced-draft fan inlet. This is automatically controlled by a temperature controller connected to the exit gas flue. The plant is equipped with a smoke separator of the mechanical centrifugal type for eliminating soot from the smoke during soot blowing periods. To further ameliorate the smoke nuisance, a stack 150 ft. high discharges the exit gases into the atmosphere at a sufficient height to insure safe dilution and distribution.

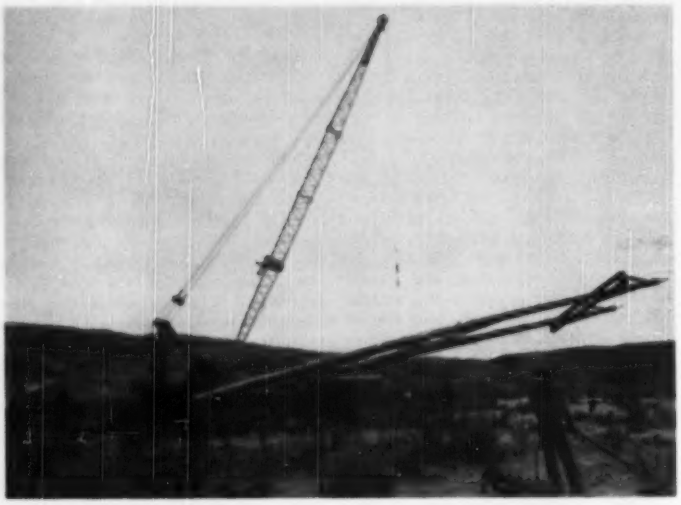
The new unit is controlled as to generator output and power distribution from the same main control room that controls units one and two. Plant auxiliaries are controlled from local boards located near the turbine, and their functions are automatically regulated through an extensive Bailey control system.

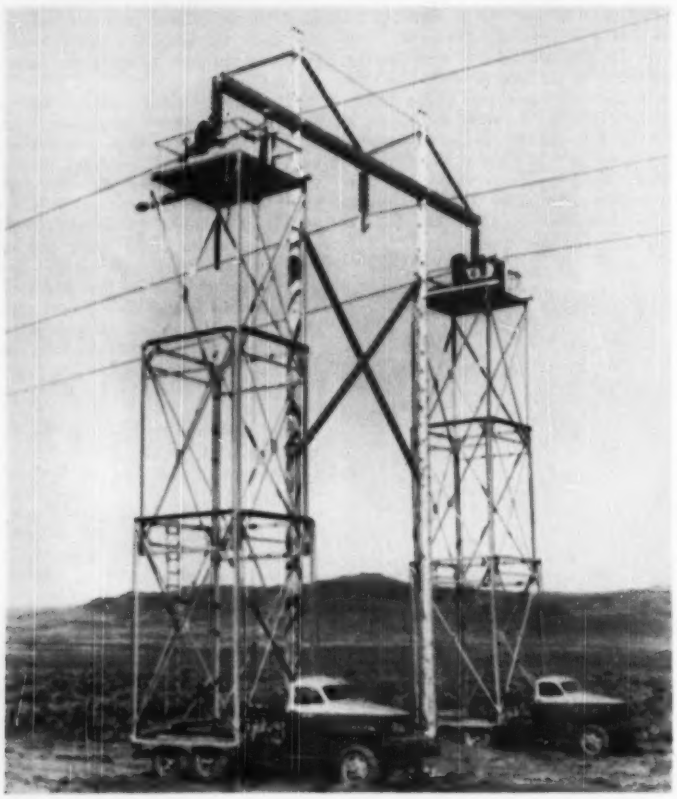
A plant communication system links together every important location so that a two-way conversation can be transmitted between all stations in the plant so equipped. There are 150 microphone stations and approximately 100 loudspeaker horns spaced so as to cover every portion of the plant. The equipment was furnished by the RCA and has a decibel rating above that of the noisiest area, so that clear instructions and information can be transmitted. This system has proved very satisfactory and is especially valuable in times of emergency.

The plant was designed by the engineering staff of the Public Service Department of the City of Burbank and constructed under the supervision of J. H. McCambridge, general manager; A. E. Capon is chief electrical engineer. C. A. Heinze has been consultant to the department throughout its power development program.

Approximately 90% of the work was contracted to various contractors for the structures, building and equipment. It is estimated that the total cost when finally completed will not exceed $130 per kw. of installed capacity. Initial runs of the unit indicate an over-all economy of less than 12,000 B.t.u. per kwh. net.

All-Out Mechanization Cuts Line Costs





TRUCK-MOUNTED platforms that can be elevated to a total height of 49 ft. above the ground for stringing and armor-rodding conductor, and a truck-mounted crane that erects in one piece a completely assembled 138-kv., two-pole, H-frame structure were the means by which Idaho Power Co. made up for time lost in litigation over construction of a 138-kv. line from its Bliss plant to Boise. All-out mechanization of every possible construction procedure, made possible erection of structures at a rate of 30 to 36 per day, stringing of wire at more than four miles per day, and the completion and energizing of the line by Nov. 27 in time to carry load for the winter peak. All this was accomplished through the hilly and sandy country of southern Idaho, where all-wheel drive was required on practically every vehicle used in the field. The remarkably low cost of $17,703 per mile shows what can be accomplished with careful planning and a high degree of mechanization. Had the additional insulator units on tangent structures required for 230-kv. operation been installed, total cost would have been $18,123 per mile.

The 73-mile line and a companion 116-mile line from Bliss to American Falls will serve as primary transmission lines, and are designed and built with spacing and clearances suitable for conversion at a later date for 230-kv. operation. Wood poles and arms were adopted after careful study and in view of experience which verifies the unusually long life and practicability of wooden structures in the area to be served. This type of construction is considerably less expensive than steel and has a minimum anticipated life of 40 years.

Construction of the line was handled entirely by company crews. Power tools — air-driven, electric-driven, or gasoline-driven — were used in every possible way. Digging crews used seven truck-mounted compressors and a mechanical digger even though 90% of the holes required dynamite because of hardpan and cemented gravel. Materials were distributed by all-wheel drive trucks and spotted as near structure sites as possible.

Raising structures as a unit (upper) and use of truck-mounted elevating platforms (below) were examples of cost-saving construction methods used in building new Idaho Power Co. line

Three framing crews, each consisting of eight men with a heavy pickup and a truck with a winch and derrick tripod, used 1½-kw. generating sets for a-c power to operate electric drills, saws and other tools. Jigs which could be located by tightening a single clamp screw were designed for field drilling of holes in the end phase and center conductor fittings of the structure. Drilling in the field eliminated tension or compression in the braces, which always resulted from different pole diameters if holes were pre-drilled. Ground assembly was facilitated by a complete assortment of small tools, socket and ratchet wrenches, sawhorses and framing jacks.

Erection was mechanized almost completely by a special crane built and mounted on a large 6x6 truck as illustrated. Requirements for the crane were that it be completely mobile, that no assembly work be required after moving it to the site, and that one man be able to operate the entire unit. Mobility was provided by the 6x6 truck. For immediate availability and maneuverability, the base of the derrick was mounted on the extreme back of the truck, allowing the boom to overhang the cab. To reduce boom height in the traveling position, two hydraulic jacks were inserted to allow the first section of the boom to be hinged. The regular back-of-cab winch was used to operate the load line, and a special winch was installed on the back of the unit for handling the boom. The entire assembly sits on the truck deck, and can be removed or installed in about four hours, leaving the truck as a conventional heavy-duty hauling unit.

In operation, the completely assembled pole structure is lifted bodily by a sling as shown, the X-braces on the poles eliminating the need for a spreader bar. After leveling and aligning, the backfill is made by a bulldozer and the material compacted with air tampers. This procedure allowed erection of a maximum of 36 structures per day, 30 per day being quite ordinary production.

After erection of the structures, conductor and insulators were delivered along the line by the same hauling unit with the crane removed. On the two outside phases where ground conditions would permit, the conductor was payed off reels mounted on suitable braking drums directly from the back of the truck to the ground.

The stringing sheaves and insulator strings were assembled to the conductors on the ground, and elevated by winch through a small gin on top of the structure. A through-line was placed through the center stringing sheave and allowed to hang down on each side of the X-brace to the ground.

Typical dead-end on 138-kv. Idaho line

A special pay-out and take-up reel was built for the stringing-line on the center phase, and used also on the outside phases where the terrain was very rough. After about one mile of stringing-line had been carried through the stringing sheaves, the conductor was attached with a cable grip and pulled through, then sagged with the aid of a carefully checked dynamometer.

Armor-rodding was speeded by use of the elevating platforms previously mentioned. Three special towers were built on 6x6 truck chassis, with platform areas approximately nine feet wide by ten feet long. When collapsed in the traveling position they had a total height of 19 ft. Fully extended the three telescoping sections put the platform 49 ft. above the ground. They are elevated simultaneously by means of a cable arrangement working off the regular back-of-cab winch on the truck. Sprockets and chains insure synchronism and stability in operation of the tower. Two-way communication from the platform to the truck driver facilitates placing and elevation of the platform.

After the conductor is tensioned a stringing tower is driven under it. Three men mount the platform and are elevated into position directly under the stringing sheave. A post support or the railing of the tower lifts the conductor so the stringing sheave can be removed. The conductor is then placed in the clamp, together with the armor rods. The tower is lowered slightly so the clamp and armor rods take full weight of the conductor. The armor rods are then twisted on and the end clamp applied. Time for this complete operation on one conductor, including traveling time from structure to structure, averaged approximately 15 minutes. With this equipment it is possible to do the complete job of stringing, from insulators in crates and conductors on lagged reels, at a rate of over four miles per day.

To coordinate operations, two-way radio on practically all trucks plus several walkie-talkie sets were in constant use. This equipment paid for itself several times over during the work. It would have been impossible to coordinate and finish the job in the time available without it.

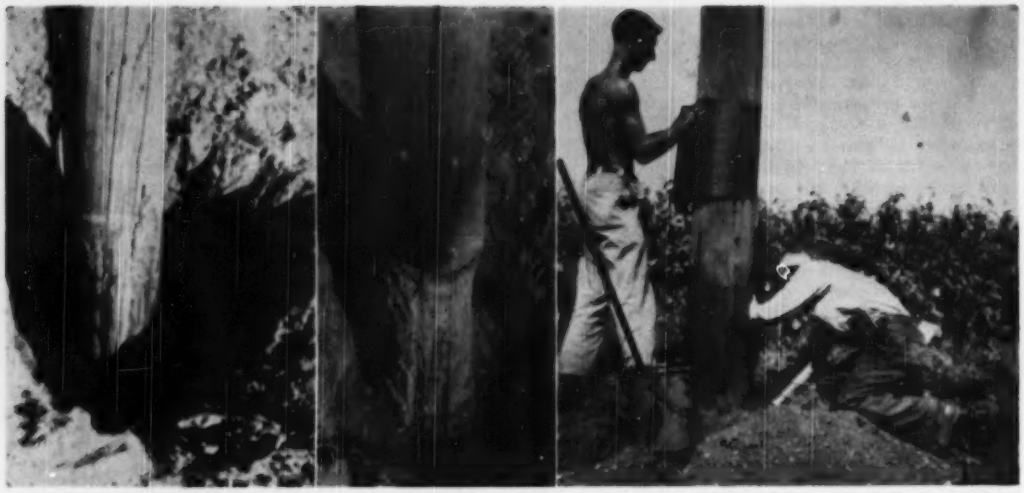
Regular truck maintenance was handled on the site by mobile repair units. Most greasing and a considerable amount of regular service and maintenance work had to be done while the units were in operation as the job could not be held up or stopped for them to be brought into a regular repair or service facility. Equipment was maintained in a new condition as nearly as possible. Any accidental damage, no matter how trivial (even bent fenders), had to be repaired and repainted immediately. This had the effect of maintaining high responsibility by the operators and giving exceptionally good care to the equipment. End result was very low actual maintenance and an absolute minimum of field failures.

Design

Of interest from the standpoint of design is the 20-ft. spacing of the normal tangent structures. These consist of two 65-ft. western red cedar poles, class 2 or 3; 40-ft., 4 x 10-in. double plank penta treated clear fir crossarms, and penta treated fir braces with 3⅝ x 7½-in. section on X-braces and 3⅜ x 4⅜-in. section on K-braces.

Angle and deadend structures are guyed with ½-in. extra high strength stranded cable, with impulse insulation level raised to 220 kv. by use of 16-ft., 35,000-lb. wood strain insulators. To reduce ground resistance on these special structures all anchor rods are bonded with a loop of 5/16-in. stranded cable. Tangent structures are fitted with a ground plate on the bottom of each pole, connected by a No. 6 copper wire to the shield wire brackets on the top of the structure and to the crossarm mounting bolts and X-brace attachment bolts. The plates are also connected to each other by a buried tie wire. Ground wires will be provided on 5,000 ft. of line at each end of each section initially, but provision has been made on all structures for eventual installation of ground wires on the entire length of both sections.

Other pertinent data: conductor 450 MCM copper equivalent ACSR, ultimate strength 28,000 lb.; insulators 10-in. diameter, 5¾-in. spacing; armor rods aluminum, 10-ft. long, ½-in diameter; basic ground clearance 30-ft. at 120°F; average span 660 ft.



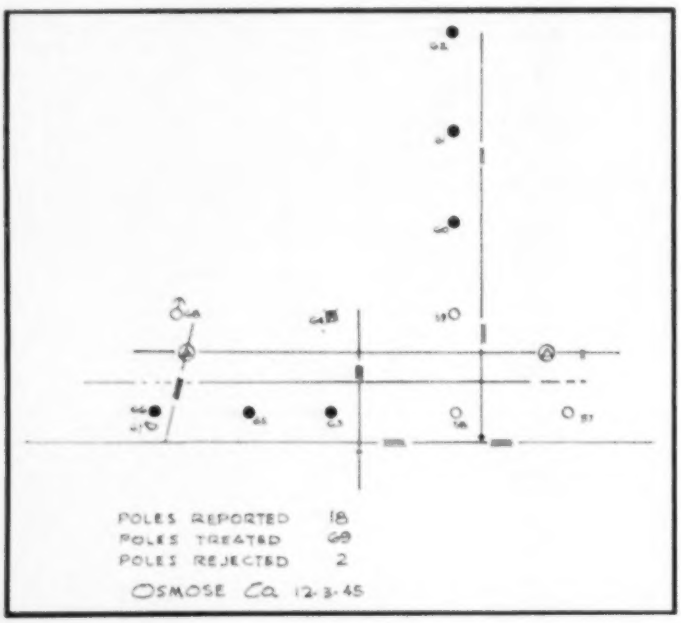
Excavation is made (left) to expose pole below ground line. Decay is removed (center) and bandage made ready (right)

It Pays To Groundline Treat Poles

More than two million poles have been treated by the process described – 200,000 in the West

G. C. Daggett

Public Service Co. of Colorado, Denver

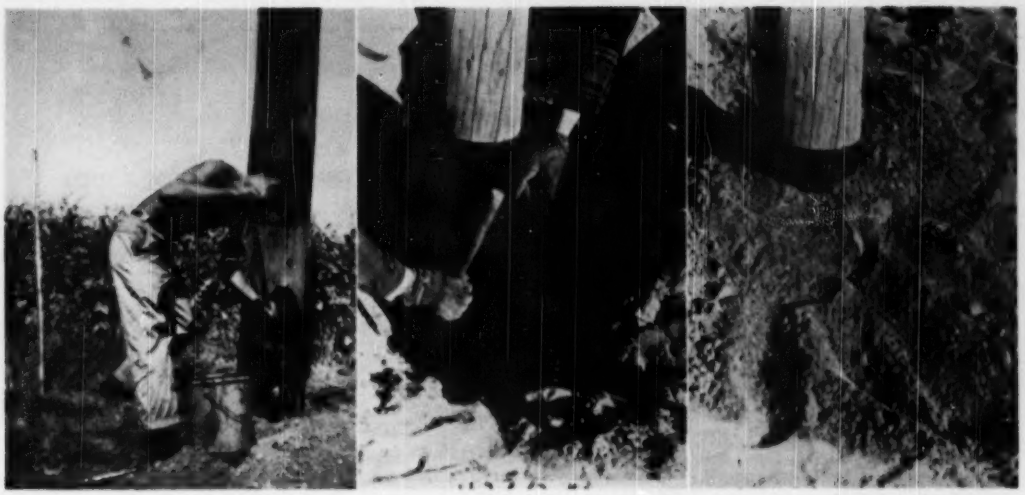


THE objective of our pole inspection and groundline treating program has been to extend the service life of standing poles as long as possible, commensurate with safety, so that annual pole maintenance cost will be held to a minimum. The result is a maximum return on the money expended consistent with maintenance of a high standard of service, a satisfactory physical condition of pole plant and the cultivation of good public relations. It is confidently believed that this program has extended the useful life of poles many years.

Our practice has been to purchase new poles so treated that we can reliably forego inspection for a predetermined number of years. However, there are many poles that have been in use for many years and these are the ones that our program must bring out to be tested.

Extensive tests were made to prove

Data recorded by pole treating contractor working from photostat sections of utility's pole maps constitutes a complete inventory of all poles on system



Osmosplastic compound is applied by brush (left), bandage is fitted (center) and the excavation backfilled (right)

the type of inspection and treatment to be used and to set up the program so that it will be carried on in the future. There have been over 35,000 poles treated in the past eight years and to check the effectiveness of the treatment an examination of scattered poles was made four years ago and again during the past summer. The results of these tests substantiate our initial confidence that many years of additional service life are acquired.

Groundline Decay

Although poles are replaced for numerous reasons, by far the largest percentage of stubbed or replaced poles is due to decay. This decay occurs in the outer layer of the cellular structure of the pole from just below groundline to possibly a foot or so below ground surface. The decay thus is not visible and can only be detected by excavating around the pole.

Pike pole tests indicate when a pole has reached the end of its service life, and it is then too late to apply any effective treatment. Probing the pole at the groundline is harmful as it breaks through the original treatment, and thus leaves avenues where decay starts.

We have used the Osmose method of groundline treatment. In actual practice, poles that have reached a certain age are excavated to a depth of 17 inches and cleaned by removing all outer decay. The pole is then measured and inspected to ascertain if it still has required strength; if so, it is treated. If decay has weakened or reduced the pole to below required strength, it is scheduled for stubbing or replacement.

The various steps in treating procedure are illustrated by the accompanying photographs.

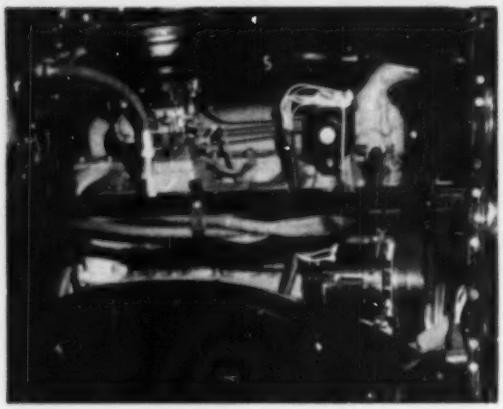
Program Continued

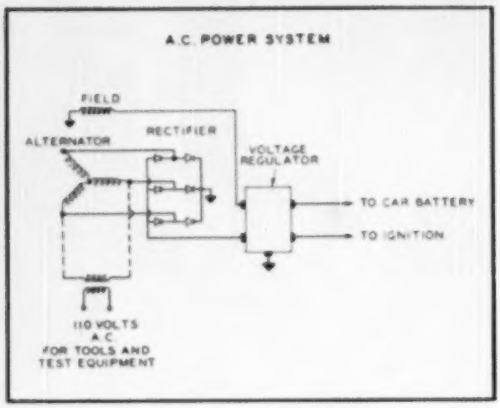
There are a few thousand poles yet to be inspected and the program will be continued this year. The Osmoplastic groundline treatment will be used at this time. We have found that, by combining inspection with reliable groundline treatment, the cost of both is reduced. Aside from the additional years of service life which affords the greatest savings, the inspection part of the program is worth a good percentage of the total cost inasmuch as we will get an inventory of our poles, the condition of not only the poles, but arms, guys, in fact, all parts of the overhead distribution system. Dangerous poles and any other unsafe conditions are reported. We have done some of this inspection and treating work with our own forces but, because of the present lack of skilled labor and inasmuch as we will get the same records of inspection and the same type of groundline treatment, the balance of our program will be done under contract.

Badly decayed. Pole could have been saved if treated several years earlier

Work from Maps

The inspection and treating crews work from our maps and record all necessary data on field work sheets. The pole numbers on the map correspond to numbers on work sheet. When the work sheets are returned to the respective division office, work orders are prepared and information is recorded on the map. Drawing illustrates a section of map—on this particular map 69 poles were treated (filled in circles), 18 poles reported (not inspected or treated—open circles), and 2 poles rejected (circle crossed out) as being too far gone to treat.





Variable frequency six to eight volt a-c generator with rectifier supplying up to 80-amp. d-c, is substituted for conventional car generator to supply additional power requirements of mobile radio equipment. Single-phase, 250-watt transformers can supply up to three 110-volt a-c circuits for tools, floodlights, etc. The newer three-phase high-frequency portable tools can be suppled by two transformers in open delta providing 433 watts of power

Mobile Power Supply for Radio Tools

R. L. Brinton

Pacific Gas and Electric Co., San Francisco

ONE of the problems posed by extensive use of mobile radio equipment on trouble cars and line trucks is that of adequate power supply. In addition another portable power requirement has arisen. It is the need for 110-volt a-c power for the portable tools now used in line construction work. A new three-phase a-c generator, equipped with a rectifier, which is substituted for the conventional 6-volt d-c car generator, would appear to be the solution to both problems.

These generators produce a rectified current of 80 amp. and can supply power for two-way radio, flasher and spot lights without excessive battery drain. They will supply 35 amp. with the engine idling and a uniform output of 80 amp. with the vehicle cruising above 12 m.p.h. Cars equipped with these a-c generators can also be used to operate standard 110-volt a-c tools, lights and other appliances. This is made possible by the introduction of a simple transformer that steps the 6-volt current of the car's system up to 110 volts a-c. The transformer, delivering 250 watts at variable frequencies, is connected direct to one phase of the system's alternator as shown by the accompanying diagram. Output is taken from a standard a-c outlet built into the transformer.

The alternator-transformer combination furnishes ample power for the operation of small motor-driven tools, soldering irons, extension lights, floodlights and the like. Another particularly useful application is a 110-volt a-c supply for electrical field test equipment. Quite often it is necessary to make adjustments and field measurements at locations where there is no 110-volt a-c supply available. Most inverter-vibrator power packs operated from a 6-volt battery do not supply over 75 watts, which is not sufficient for larger pieces of test equipment. Another suggested use is that of supplying a-c power for the newer high-frequency, compact, lightweight portable tools now coming into use. Frequency of the alternator is, of course, variable with engine speed. An inexpensive vibrating reed frequency meter could be used for indicating frequency, or a simple tachometer on the engine, calibrated in frequency, would do.

Three of the transformers, each connected to one of the three phases of the alternator, may be used to obtain three 250-watt circuits. In this type application an equal load up to 250 watts maximum can be imposed on each of the three circuits. Either one or all three of the circuits (never two) must be used whenever 110-volt current is being drawn. Two transformers, connected to two phases of the three-phase alternator in an open-delta circuit, also may be employed to provide 110 volts, three phase for the operation of the high-frequency tools mentioned. In this application, a maximum of 433 watts is obtained. Maximum output and efficiency of the transformer is obtained even when the car engine is idling and the alternator system is functioning normally in the maintenance of a high rate of battery charge at the same time.

The generators were originally developed to provide the power necessary for operation of mobile radio equipment and have received wide acceptance for this purpose. They are extensively used for police cars, taxicabs, trucking lines, etc., and are now entering the utility field. The development of the transformers to be used with the a-c generator has greatly extended potential uses to other fields. The new a-c power system described gives promise of becoming a very valuable tool in utility operations.

ELECTRICAL WEST *Contractors' News Letter*

QUICK NEWS ON TRENDS, LAWS, CODES, MATERIALS, EQUIPMENT, COSTS, WAGES, ETC.

Quicker coverage

This is a **new feature** for **contractors**—and for all associated with them, **estimators, design engineers, superintendents, foremen,**—for **inspectors** too and **wholesalers' salesmen** can take a look also. Its purpose—to tip contractors off on **new devices, new materials, business trends** that will **make them money** if they use them, **save them money** if they heed. It will be quick, short, snappy. If you want more information, drop us a card. We'll give you more news, quicker, in less space this way.

Crystal ball

How will business be for contractors in 1950. The experts are beating their brains out figuring. It boils down to this—About as good as 1949. May be less private building, more public. Housing still going strong. Many who have waited are thinking prices won't come down, so they'd better build now.

That spiral

Prices are already **inching up** to cover **pension costs.** Wages come home to boost—prices. They are like Siamese twins. Wherever one goes the other has to. Politicians and labor leaders theorize and rant, but nature wins.

F.o.b. or not f.o.b.

Conduit prices still up in the air over the basing point question. **Federal Trade Commission** is split on what to do. One compromise would permit mills to quote either f.o.b. prices where desired or delivered prices, absorbing freight. Others on FTC want hearings to be completed, decision later.

Exempt

NLRB, you may have heard, has decided not to require individual shop elections as per **Taft-Hartley Law,** in the **construction industry,** because of the transient employment. Some tests of the closed shop issue are due in 1950.

Hot feet

From Portland, **Manufacturers Engineers Co.** is making a **portable panel heater** rugged enough to put furniture on, walk on, use on concrete floors safely; called Sun Panels, for "radiant heat beneath your feet." It is water-proofed, has thermostatic control, operates from a 15-amp. receptacle. Should offer contractors an appealing item to sell to homes, offices, factories.

Plastic plug

And **Philips Switch & Mfg. Co.** of Davis makes a new shock and short proof attachment plug cap as well as a line of **TeeVee wiring devices.** Embodies strain relief grips. Made of polystyrene, comes in clear, brown and ivory.

Quick assembly

BullDog Electric Products has a new plan to give contractors quick service on its **Pushmatic Electri-Center.** Instead of carrying a large inventory of panelboards, distributors now stock a basic supply of centers and an assortment of **Pushmatic** circuit breakers. Those of desired rating and type are selected and assembled quickly into a center to meet a customer's need.

Parade

Tri-State Supply has a new catalog for contractors listing 5,000 items from the 19 lines it handles for national manufacturers in the West, according to **C. F. Bowers,** its president.

Tapes

Even **Bauer & Black,** whom you think of as making bandages, has a line of industrial and electrical **plastic tape,** called **Polyken.** This makes three now since M&M **Scotch Tape** went electrical. **Van Cleef** calls its **Plastix.**

Data too

For schools, offices, drafting rooms and stores, **F. W. Wakefield Brass Co.** has a new catalog No. 50, called **Over-All Lighting,** covering its standard and slimline, luminous indirect and direct-indirect fluorescent equipment, as well as its standard incandescent equipment. Also contains needed lighting data for contractors and illuminating engineers.

Winter, Summer

Useful to contractors and lighting salesmen in preparing sports floodlighting layouts and presentations is a 40-page booklet, **NEMA Standard Floodlight Layouts for Floodlighting Sports Areas.** Covers everything and every season —from ski slopes to skeet shoots. Contains 26 layouts and all the data needed, without brand designations so it can be used with whatever equipment you sell.

Hold that screw

Do you like really fine tools? Well, **H. D. Hunter & Co.** of Los Angeles has a line of precision-made screw-holding screwdrivers, working on an ingenious principle to hold the screw tight, yet release it quick. It ought to save any electrician more than its cost in one day's time saving. It comes in five sizes, has shock-proof amber handle.

Plug pins

Elwood Wilds of Portland is coming out soon with a line of **cold cathode fluorescent fixtures** which admit plugging in of four standard hair-pin type cold cathode tubes, featuring easy installation on a fixture stud or hanger; uses a **Sola** ballast. Western agents have been appointed. Wilds makes cold cathode **traffic signs** used in Portland.

Real policy

A policy of **selling through electrical contractors** is being explained to them by representatives of **Mitchell Manufacturing Co.** The new **Mitchell Module** will be **fair traded** at wholesale level to protect the wholesaler and contractor against injurious and uneconomic practices, says **Bernard Mitchell.** The module fixtures, which can be assembled in all manner of patterns like dominoes, offer the utmost in flexibility for fittings to surroundings and architecture.

Packaged dimming

Portable Powerstat dimmers in packaged units are being offered by **Superior Electric Co.** of Bristol, Conn. These units solve a problem for small stages in schools, churches, community theaters. Also has an 850-watt dimmer for restaurant or cocktail lounge lighting.

Home

A very attractive line of residential lighting fixtures is pictured in a new catalog of **Atlas Electric Supply & Fixture Co.** of Los Angeles.

Takes heat

Been waiting for a recessed lighting fixture that would take a 500-watt, bi-post flood or spot light? **Associated Lighting Service** of San Francisco has announced a **Westlite,** 12 x 12 x 22-in., bottom or top access, UL labeled, made for just such a lamp.

Can grow

Ad-on is what **Square D Co.** calls its multibreaker line that simplifies assembly of up to eight breakers in a basic block unit in any combination wanted. Should speed delivery of any breaker set-up a contractor might need with units of 15, 20, or 30 amp.

Lamp life

Certification that **cold cathode lamps** are standard as to color and quality is being developed by the **Fluorescent Lighting Assn.** It also announces that CC lamps are now rated in excess of **15,000 hours life,** regardless of starts, with 75% light output at the end of that period. The association has available a **Lighting Guide,** a booklet on **how to install** CC lighting and a **manual with technical data** relative to such lamps.

Road shows

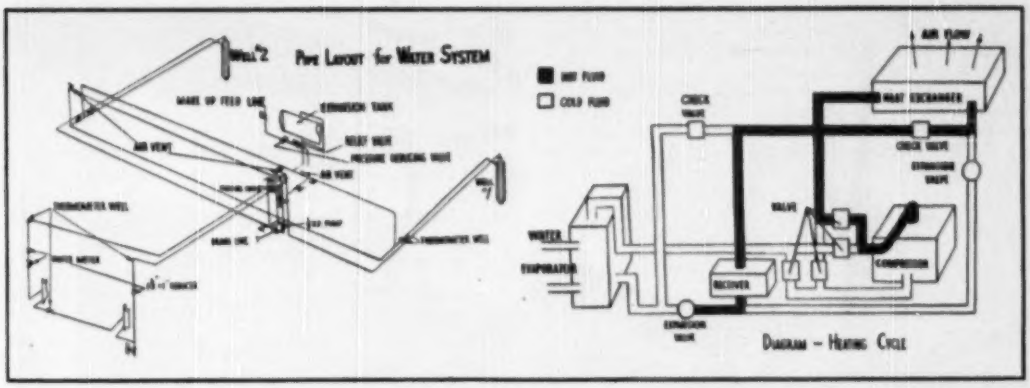
Electrical Contractors Society of Washington starts a series of educational road shows soon in Tacoma, Everett, Mt. Vernon, Bellingham, Bremerton, Aberdeen, Chehalis, Vancouver, Wenatchee, Ellensburg, Yakima, Pasco and Walla Walla, in cooperation with manufacturers and their reps. The show has 12 displays. Meetings will have four or five short selling idea talks, and educational ones on estimating, etc.

Heat for drive-ins

Cozy warmth furnished by a 200-watt electric heater is an added attraction at a Riverside, Calif., drive-in movie. Heaters are connected by flexible cord to the posts that carry the sound equipment. Another installation is going in at San Jose. Takes a lot of wire, conduit and other electrical equipment for such an installation. Looks like a **big new market** for wiring contractors. Who will be the first contractor to spring it on his local outdoor movie. Story with more details will appear in March issue.

Briefer yet

Varied and Sundry—San Francisco Bay Bridge may soon be relighted with **slimline bridge rail units** replacing golden sodium overhead butterflies.... **National Adequate Wiring Conference,** St. Louis, Feb. 16-17, will give a detailed study of a successful AW operation in that city. Hearings on **California State Safety Order** proposed revisions start in San Francisco Jan. 10-11, Los Angeles Jan. 17-18. Will be electrically recorded.... G-E's traveling lighting clinics are being booked for the Utah P&L and Idaho Power area.... **Dr. D. B. Harmon** has been addressing meetings of architects and school officials in the West.... **American Iron & Steel Institute** has a fine book on **Steel Electrical Raceways** at a dollar a copy.... **Lightolier** offers a new fixture **style book.**



WHAT ABOUT THE HEAT PUMP?

DESIRING to obtain first-hand experience on a residential heat pump, the Utah Power & Light Co. decided to use the home of its sales manager, W. A. Huckins, for a trial installation. Sufficient time has now elapsed since the job was completed to be able to make some observations and draw some conclusions. At the outset it must be said that residential heat pumps are far from being a tried and proved package item that can be offered the public. There are many "bugs" to be worked out cooperatively by all concerned. The first year's experience with Huckins' installation is here offered in the nature of a progress report.

This report was compiled recently by H. B. Swaner, superintendent of steam distribution, who supervised the installation and followed the operation of the equipment at the Huckins' home. Some additional data are added since the report was first made indicating that most of the earlier troubles have been solved.

The Huckins home is a six-room, brick house located at 403 Douglas St. in Salt Lake City, Utah. It is typical of homes of that region of the west. Total space heated is 10,350 cu. ft. Heat loss based on 0°F. outside temperature and 72° inside, is 75,000 B.t.u. per hour. The house had been heated by a 60,000 B.t.u. per hour stoker and blower equipped coal furnace.

To extract heat from the earth it was decided to devise a closed system of piping through which water could be circulated to transfer heat to the refrigerant of the heat pump. An attempt was made to force a 4-in. pipe through holes in the basement walls into the earth on a slight declining angle to afford an earth piping system. A very thorough trial using a pipe pusher proved the idea to be impracticable due to difficulty in overcoming upward thrust of the pipe pusher. The original idea of a near horizontal piping system had to be abandoned due to the small lot and the fact that it was completely planted in shrubs and lawn.

Original design had provided for a total of about 700 ft. of 4-in. well but because of expense involved and after encountering underground water it was decided to install initially only about 500 ft. of well. This is divided between two wells—one 300 ft. deep, the other 197 ft. deep. This amount of well has proved insufficient for the heat required and for good coefficient of performance.

The complete heat pump system is composed of three separate sections: First, the Marvair heat transfer units, of which there are two; second, the earth system; and third, the controls. One Marvair unit contains a ½-hp. motor-driven fan, the second houses a conventional refrigeration system with pulley-driven compressor using a 3-hp. motor. The earth and piping system is shown by accompanying diagram. The two 4-in. wells, previously mentioned, are of pipes sealed at the bottom by tamped oakum and lead wool. Suspended inside each of these 4-in. pipes is a 1½-in. pipe open at the bottom and with sides slotted on the lower 10 ft. The two wells are interconnected and cross-connected with 1½-in. pipe so that water may be circulated through either, in series or in parallel.

The entire piping system and water evaporators contain approximately 350 gal. of liquid which is continually circulated, none being wasted. To protect against freezing, 22 gal. of denatured alcohol was injected into the system along with about 328 gal. of water. This mixture afforded protection to a temperature of 270°F.

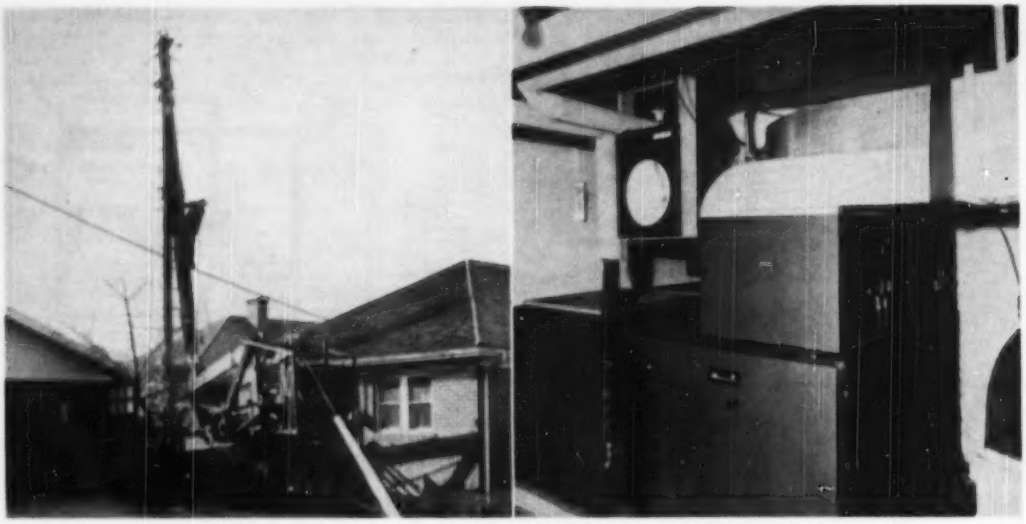
Late in April 1948, the installation was completed and tested. After preliminary adjusments a test run for a 7-hr. period was made. This showed a coefficient of performance of 3.47. A short test of 7 hours, however, is no criterion of capability of the system under actual cold weather operation.

After being tested, the system was placed in actual operation May 13, 1948. Since that time operation has been suspended 11 times.

The duration of these interruptions was from two hours to as long as three weeks. Causes were mostly difficulties encountered in the package unit. However, the longest shut-down (from December 24, 1948, until January 14, 1949), was due to an obstruction in the 300-ft. well piping. The obstruction, believed to be ice, was only dislodged after repeated applications of city water pressure.

Difficulty was encountered in the compressor valves leaking. The Servel Co. has suggested replacing the valves, heads and valve plates with a more recent design. During the summer of 1949 new type valves, plates and heads were installed on both machines and operation now (Nov. 1949), seems to be more satisfactory than a year ago.

From the beginning of operation, the installation was hampered by a leak in the piping of one well. As the exact location of the leak was not known, and as the water was relatively



Well diggers (left) sink 500 ft. of 4-in. well for heat pump. Heat pump units and heat exchangers are shown at right

cold, it was very difficult to seal the leak. Consequently it was decided not to anti-freeze the system until the leak was sealed.

Four pounds of "Boiler Solder Seal" was dissolved in the 350 gal. of water. As sealers require heat to produce a firm seal, many weeks elapsed before the leakage was stopped.

With the system in heating cycle operation the demand varies from 7.0 kw. to 8.3 kw., due to increasing compressor head pressure as the temperature of the water circulated decreases. The kwh. consumption for heating per degree-day varies greatly. This figure is from 1.403 to 2.645 kwh. per degree-day. The variation is from day to day and from month to month. This is puzzling unless the current consumption is tied in with the water temperature. It would seem, from data so far available, that as the water temperature decreases the use increases, but further study should be made of this. Under normal cold weather operation, the load factor is as high as 55% for some days. The longest constant period of use occurs between 7:00 a.m. and 10:00 a.m.; use from then until midnight is irregular and intermittent.

A normal year in Salt Lake City has 5,555 degree-days. Based then on the above consumption of 1.403 to 2.645 kwh. per degree-day, it is estimated that this system will use between 7,800 and 14,700 kwh. per heating season.

The accompanying table indicates that from June 2, 1948 through April 4, 1949, the total heat pump energy consumption was 7,152 kwh. Had this been billed under the utility's Schedule 2 combined with all other energy consumed, the rate earned would have been 1.44c per kwh., and the bill $103.07 for the ten-month period.

Of course, the greatest operating difficulty is to extract from the earth sufficient heat to maintain a steady supply of water at a desirable temperature, which should preferably be at least 50°F.

From the beginning the inside pipe surface needed protection against corrosion. As an inhibitor a solution of potassium dichromate and soda ash was fed into the piping system and a pH reading of 7 is maintained.

One problem still unsolved is the disposal of the moisture from the defrosting action of the unit which occurs each time the unit is not in use during the summer cooling cycle. At present this runs onto the basement floor and into a floor drain.

During the period of heating cycle operation the exposed piping in the basement would "sweat," making fiberglas insulation necessary.

Also, one other problem of operation is to eliminate the rush of cool air that is transmitted to the house each time the system commences to operate, as there is a seven-minute interval after the start of the fan, before the air reaches about 100°F. This, it would seem, is a manufacturer's problem.

The rapid rate at which heat is extracted from the earth and the slow recovery of the earth indicates that the earth piping system is not of sufficient length. Marvin Smith, vice-president of the Muncie Gear Works (manufacturers of Marvair), has stated that 66-2/3 ft. of pipe below the static water level in the ground is required per ton of refrigeration. The Huckins installation has 491½ ft., or about a 26% deficiency. Had the additional 200 ft. of well been installed, it would no doubt have proved sufficient.

Heat Pump Failures

July 23, 1948. North unit was found to be low on oil. One pint added to refrigerant system.

September 15, 1948. One set of valves (two) was found to be leaking. Remedy was a new valve assembly.

A portion of Freon 12 gas was lost from south unit, due to a small leak in gas piping system. Recharged October 21, 1948.

November 11, 1948. Repetition of gas lead in same unit.

November 16, 1948. The starter condenser on the compressor motor of the north unit failed and was replaced.

December 24, 1948. The pulley on shaft of motor driving the air circulating fan of south unit was found to be slipping. This pulley was not installed at the factory. The system was shut down at this time until January 4, 1949. On starting up again, the heat pump ran for about two days when an obstruction occurred in the water piping causing another shut-down to January 14 before the piping was cleared.

January 14, 1949. The piping system and/or south well was either frozen or obstructed by some undetermined substance. This required many hours of work to remove the obstruction and was finally cleared by the use of city water pressure flushing the affected portion of the piping system.

February 7, 1949. The north unit

was found to be in need of Freon 12 gas. A leak through a groove on the compressor head was the cause. A new gasket was installed and gas added. This gasket was replaced by serviceman when replacing the valve plate assembly on September 15, 1948.

February 23, 1949. The starter condenser on the compressor motor of the south unit failed and was replaced and operation resumed on February 25.

February 27, 1949. The south unit began to operate on short cycles and consequently was shut down. This indicated leaking compressor valves. By March 4 two new valve plate assemblies permitted resumption of operation.

March 5, 1949. It was observed that the compressor on the south unit was sticking or binding to such an extent that it was again taken out of service and has not been restarted to date (May 5, 1949). In the meantime the north unit is providing adequate heat.

Conclusions

It is believed that a better bond between the earth and the piping can be obtained by installing the "earth system" horizontally rather than vertically. In drilling vertically the earth does not fit tightly against the pipe and cannot be tamped to produce the desired contact. However, underground water helps provide this bond.

When vertical piping is used it should be tested with city water pressure before being placed in operation. This will allow chemical treatment of only that part of the system wherein any leak may be.

The supply piping from the circulating pump might be installed, if possible, under the basement floor and not overhead. This should minimize noise and vibration.

All equipment should be located so as to afford access, not only for installation but for maintenance and repair.

Thorough study of the earth texture should be made and ample pipe installed because ample earth to piping contact will result in a steady state of conduction of heat.

A very desirable feature in the heat pump is automatic control to change from the heating cycle to the cooling cycle. Some manufacturers have incorporated this in late model machines.

The housing of the two units does not lend itself to ease of access in case of trouble. Usually more time is spent dismantling the units than in making minor repairs and adjustments. "Phillips" screws have been used in assembling the housing, but the frame is so thin that threads strip easily.

The housewife, who must prove all home appliances, complains of noise from fan and compressor, as well as floor vibration. However, vibration was minimized by use of flexible pipe couplings, canvas sleeves and sponge rubber mounting. This also reduced the noise. Now, after many months of operations, it has become more acceptable and the type of heating is very desirable. However noise elimination is one of the major needs which manufacturers must face if such equipment is to find universal acceptance. Noise levels which would not be noticed in an office or factory are far too high for toleration in a home.

The theory of the heat pump and the type of heating afforded is excellent, but before its acceptance generally the difficulties of operation must be eliminated and the efficiency of the system must be improved.

To obtain the optimum in the heat pump, further research is required on mechanical assemblies, accessory equipment, method of heat distribution, and reduction of noise and vibration.

TEST RUN—MAY 13, 1948
Results on One Unit and the 300 Foot Well

Time	Gals. of Water per Hour Test Started	Temp. of Water From Well	Temp. of Water To Well	Temp. Difference	B.T.U Obtained From Water	KWH Used	B.T.U. Equivalent	Total B.T.U. Obtained	Temp. of Air To Unit	Temp. of Air From Unit	Temp. Difference	C.O.P.
9 AM	...	56°	45°	11°								
10 AM	585	47°	38°	9°	43,857	4.4	15,017	58,874	70°	110°	40°	3.92
11 AM	503	46°	39°	7°	29,330	4.1	13,993	43,323	76°	113°	37°	3.10
12 AM	627	45°	38°	7°	36,560	4.1	13,993	50,553	78°	114°	36°	3.62
1 PM	631	44°	37°	7°	36,794	4.2	14,335	51,128	78°	112°	34°	3.56
2 PM	630	43°	37°	6°	31,487	3.9	11,811	43,298	79°	112°	33°	3.66
3 PM	634	42°	36°	6°	31,687	4.3	14,676	46,363	78°	112°	34°	3.16
4 PM	630	42°	36°	6°	31,487	4.0	13,652	45,139	80°	112°	32°	3.30
Avg.	605.7	44.1°	37.3°	6.8°	34,457	4.14	13,925	48,383	77°	112°	35°	3.47

ENERGY CONSUMPTION W. A. HUCKINS RESIDENCE

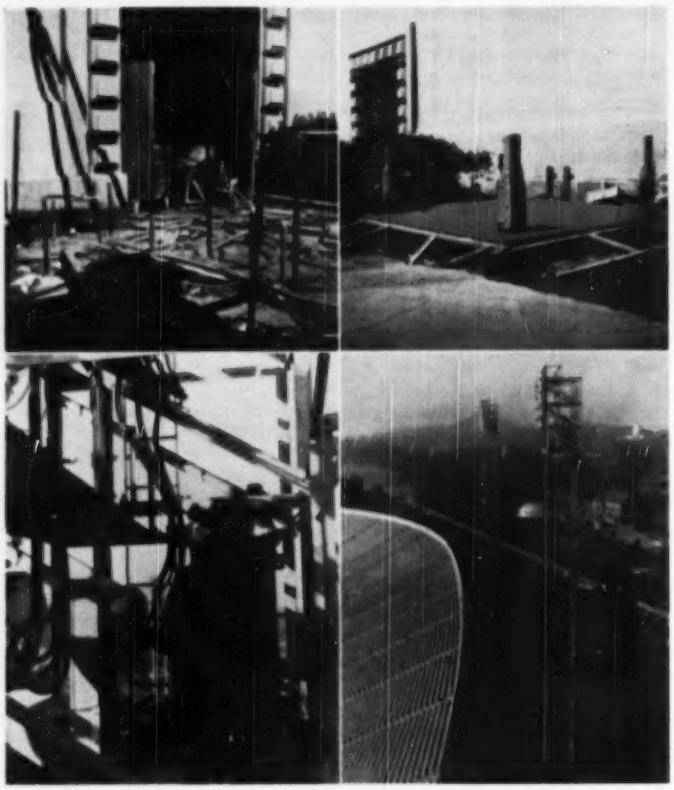
MONTH		SERVICE	TOTALITY METER USE KWH	IF BILLED UNDER SCHED. NO. 2	HEAT PUMP KWH USE (NOT BILLED)	COOLING SERVICE KWH	HEATING SERVICE KWH	AS BILLED NET KWH	AS BILLED SCHED. NO. 2 $
May,	1948	Heating Tests		(Not included in totals)	408				
June,	"	Cooling from 6/2	860	12.50	100	100		760	11.00
July,	"	"	716	10.34	246	246		470	8.03
Aug.,	"	"	532	8.59	108	108		424	7.62
Sept.	"	Cooling to 9/20 Heating from 9/21	730	10.55	326	92	234	404	7.44
Oct.,	"	"	1472	21.68	682		682	790	11.45
Nov.,	"	"	2486	36.89	1594		1594	892	12.98
Dec.	"	No service 7 days	2486	36.89	1558		1558	928	13.52
Jan.	1949	No service 29 days	958	13.97	90		90	868	12.62
Feb.,	"	No service 4 days	2222	32.93	1296		1296	926	13.49
March	"	No service 4 days	1790	26.45	1152		1152	638	9.54
TOTAL			14,252	210.79	7152	546	6606	7100	107.72

Then $210.79 — $107.72 = $103.07

153.7 = 1.44c per KWH
7152

Total cooling service 546 KWH
Total cooling service cost 7.86
Total heating service 6606 KWH
Total heating service cost 95.21

SOIL SOLIDIFICATION



Chemical solidification of loose sand effected large savings in installing tower footings for Kezar Stadium floodlighting. Smaller views from left to right show: pipes used to inject the chemical; a completed footing; tower-mounted transformer, and an over-all view of two of the six 136-ft. towers installed

CHEMICAL solidification of foundation soil was a new technique employed in the installation of footings for floodlight standards on free-running sand fill at Kezar Stadium in San Francisco's Golden Gate Park. A sodium silicate solution was pumped into the ground to permit excavation of bell-shaped pier footings without shoring, avoiding the extensive tunneling under sidewalks and stadium that would have been necessary with conventional methods. Chemical solidification was accomplished by introducing under 200-psi. pressure, 500 gal. of solution for each footing. The solution fills the voids in the soil, forms gels and cements together the loose grains for a period long enough to complete construction. The compressive strength of the solidified sand was about 75 psi.

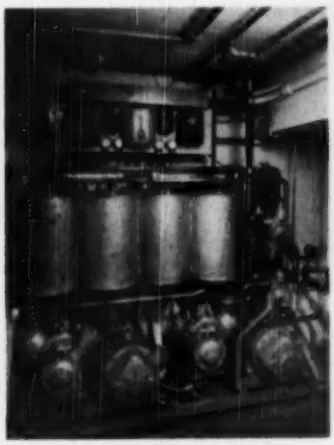
A total of 350 1,500-watt narrow beam General Electric floodlights mounted on six towers was used to light the field. Tests after installation showed an average intensity of 63 f-c on the field and 25 f-c on the remaining areas. All six towers are identical, of latticed steel, 136 ft. high, and designed to support 70 lights each. The 8x8-ft. towers are straight up to the 120-ft. level. Between this level and the tops, provision is made to mount seven rows of ten floodlights per row. Four platforms are located in this section, to support two lighting panels, a transformer, and to facilitate servicing the lights. Lights for the parking and seating areas are mounted at the 80-ft. level.

The project was designed and supervised under the direction of B. A. Devine of the City of San Francisco. Dr. J. J. Polivka, Berkeley, was consulting engineer for solidification of the sand. General contractor for the entire installation was the Pacific Electrical & Mechanical Co.

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Utilization Data Sheet No. 63

SUBJECT: Dual Heat Pump Control
CUSTOMER: Walter Dufresne
TYPE OF BUSINESS: Residence Heating
SERVICE COMPANY: Idaho Power Co.
DATA PREPARED BY: C. E. Boggs, Special Engineer

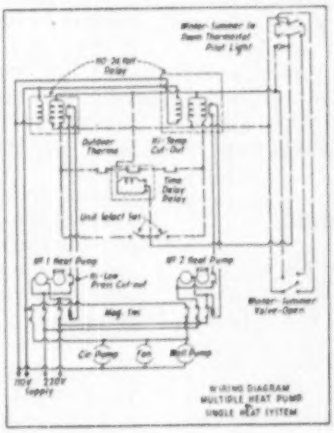


Walter Dufresne, Boise automobile distributor, specified two 5-hp. heat pumps for heating his remodeled and enlarged residence, for which design heat load was 7½ hp. Further specified was use of both radiant and warm air heating, the radiant in the new remodeled rooms and the warm air in the old living rooms and basement. Heat pumps are water-to-water with a duct coil for the air system. Fully automatic control is a feature of the installation.

Installation

The house has a floor area of 1,386 sq. ft. on the first floor; 1,117 sq. ft. on the second floor; 933 sq. ft. in the basement. Cubical content is 27,600 cu. ft., figuring, for heating purposes, one-half the actual basement space. Attic and walls of new part of house only, are insulated with 2-in. balsam wool. No floor insulation was used under unexcavated part of basement; no weather stripping or storm windows were provided; indoor temperature level is 70° to 75°; 58° well water is the heat source; hot water is circulated at 110 to 125° depending on the severity of weather.

A control scheme, as shown by the accompanying wiring diagram, was developed by the author to provide completely automatic operation throughout the seasons. One unit normally operates for mild weather heating and for cooling. When the outside temperature drops to about 20° the second unit is cut in by an outside thermostat. A Leach time delay relay starts units 20 to 60 seconds apart to prevent light flicker. A motor-operated valve effects changeover from heating to cooling. Either unit can be operated on base load, making possible maximum operating efficiency.



Hot water coils in a duct system provide heat for the old part of the house. The new part is heated by radiant ceiling panels. A toggle switch at the living room thermostat automatically reverses the system from heating to cooling. A pilot light, also in the living room, indicates operation of the heat pump. Valves in the hot water circulating system permit adjustments of temperature between the air and radiant heated parts of the house. Electric precipitron air filter is provided for the duct system.

Graphic charts showed the heat factor (kwh./degree day/1,000 cu. ft.), developed by two months of operation, to be .108, which is considered satisfactory for type of construction in this remodeled home. Energy consumption for January 1949, with 1,692 degree-days, was 5,470 kwh. For February, with 960 degree-days, consumption was 2,510 kwh. The plant operated without outage throughout the 1948-49 winter.

Graphic wattmeters have been installed on this and 15 other heat pumps in order that the utility may study the impact of this new type load on its system.

ELECTRICAL WEST

1950 Should Be Good

GOOD omen for the electrical industry here in the Far West for 1950 is the general tone of optimism that prevails as the new year begins. Our fervent hope is that, as the year advances, the progress and prosperity which the signs portend will be forthcoming. And there is sound basis for the fulfillment of that hope.

So long as the West continues to be a region of dynamic growth and undeveloped opportunities, all branches of the electrical business are sure to progress. Population continues to expand and so does industry. Both of these mean additional construction. All of which assures a good volume for the manufacturer, the distributor and the contractor, and additional load for the utilities.

Here are some tangible gages of 1950 potential: One southern California utility estimates that 51,000 new homes will be added to its lines this year. In central and northern California the estimate of new appliance business totals $117,000,000. In another utility area here in the West 90% of all new homes being built in rural areas are all-electric with average consumptions of 7,500 kwh. per year. In another area the potential appliance market is set at $432,000,000.

Unless there are unforeseen weather conditions, there should be ample generating capacity to provide for new load growth. Almost 1¼ million kw. will be added in 1950 to the generating facilities of the area. And the five-year postwar expansion programs of the utilities still have two years to go.

Whether one looks at the short-range or the long-range prospects of the electrical industry, the conclusion is the same! The future will be just as good as the electrical industry wants to make it.

Price Demoralization

WITH everyone talking about the way competition is causing contractors to bid below cost, one wonders how much distributors and manufacturers are contributing to this situation because of the competition between them. Certainly the contractor must be driving hard bargains in order to make manufacturers and wholesalers share part of his losses. He accomplishes the same end by going deep in debt to them, in the comforting knowledge that they won't let him go bankrupt. They dare not if they want to save something out of what he owes them.

More Owners for Industry

LAST month we advocated in these columns that industry do everything possible to create more capitalists. And we commended recent power company programs to sell common stock to their employees. Now along comes O. Glenn Saxon, professor of economics at Yale University, with a clinching argument in favor of building a broader ownership of American industry. Pointing out that only 10,000,000 people out of a total of 150,000,000 in the U. S. have any direct ownership or stock interest in American corporate enterprise, Professor Saxon says:

"One of the chief defects of our present society is the relatively small percentage of the total population, and particularly the voters of the country, who have a direct interest through ownership of corporate stocks or bonds, particularly the former, in the preservation of private enterprise conducted largely through the corporate form of organization . . .

"Today the enlightened self-interest of corporate enterprise and all who believe in a free society requires that American industry and business be owned widely by the rank and file of men and women who, with incomes of $5,000 or less, earn 80% of the national income each year, and also constitute the vast majority of the electorate which will determine in the final analysis whether this country shall succumb to state socialism in some form. The greatest insurance against socialism or communism lies in having every income-earner a part-owner in our system of private corporate enterprise on a safe and sound basis; that is, with scientific diversification and professional supervision."

Capitalists — little capitalists — will save America from statism or the security state or socialism. The electrical industry should do all it can to create more of them.

EDITORIAL VIEWS

Is This The Reason?

WHY don't more dealers and contractors turn out to meetings? The question is asked by those who beat their brains out trying to develop programs that interest their members, the officers and managers. Excellent programs go begging for listeners, programs full of valuable and helpful information and inspiration. True, the stalwarts who do attend are enriched by them and benefit and profit from the ideas, methods, ideals they derive from them. But why aren't the ones who need it most there?

All kinds of reasons are speculated. Many run one-man businesses that call for so much attention personally to such a complex number of details. Some important prospect or customer can only be seen at a time that conflicts with a meeting, it is said. The manufacturers and distributors hold so many product meetings that another meeting is too much, even if it be an association meeting for his own good. These are some of the excuses offered. But are these the real ones or reasons given to cover a deeper secret one a man may not even want to admit to himself?

Is it perhaps shame or anger that keeps a man away? In a time of some rather desperate price cutting and ethics-ditching many a dealer and contractor has done things to get business of which he is ashamed. He knows it, and he knows his competitors know it. So he doesn't want to face them. Just to see a competitor to whom he has done dirt is a prospect hard to face. In some cases it may be anger that he might see a competitor or a distributor whom he feels has done harm to him and he'd rather not look at or talk to the "skunk." If someone talks about "ethics" it will rub salt in the wounds.

How much of this hidden emotional cause is there to account for non-attendance? Probably much more than will be admitted. For most men do want to play the game of business decently. Pressures, they feel, force them to do otherwise. And they hate themselves for it. And stay away.

If this is so, how then can associations meet this obstacle to their programs. Only by avoiding being a disciplinary organization in any sense, but creating *more* business to share, so that there may be less need for a man to resort to debasing practices to get some of that business to survive.

Prayer for Wiring

THE Xmas tree lights—there were three strings of them—were plugged into a four-way plug which in turn was plugged into a four-way plug which was plugged into a single outlet. From this electrical abortion, additional cords led to a floor lamp, a clock, two table lamps and a radio. This sight prompted us to do a little spot checking of home wiring during the holidays. Three homes out of five were as bad or worse. In our own bedroom a single outlet serves two electric blankets, two lamps, an electric alarm clock and sometimes a heating pad or a heat lamp. All of which prompts this simple prayer: May the electrical industry in 1950 come up with a home wiring modernization program that is simple, practical and salable.

IMMIGRATION is the sincere form of flattery. If capitalism is wrong, why don't people who hate it leave America? If socialism is desirable, why don't they go to England? If communism is what the so-called "common man" wants, why doesn't he move in droves to Russia? Nobody *wants to leave America —but tens of millions of men and women all over the world, in every country, want, yearn, plead for the chance to come to America. Parlor pinks here lisp about the beauties of statism, where the government guarantees security. People in those countries know all about this business of government taking care of you from cradle to the grave. Do what you're told or you get hurried into it. They mostly prefer America, with its chance for progress, its high living standard, its liberty, its dignity of the individual. They'd swap security for your liberty any time. Look out that you aren't talked into the trade.*— From a Warner & Swasey Advertisement.

Millions in It

STILL not satisfied with past performance as one of the country's outstanding electrical industry events, the 12th Annual Electrical & Home Appliance Show, produced by the members of the Bureau of Radio & Electrical Appliances of San Diego County, soared ahead to break all previous records in attendance, number of exhibitors and in the volume of business produced.

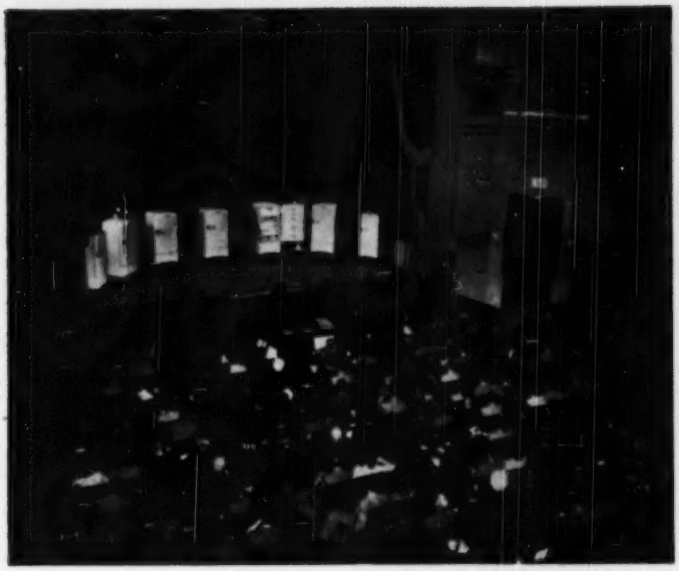
Nearly 175,000 people made their way to the Electric Building in San Diego's Balboa Park during the six-day show, Nov. 26-30, to look at and see demonstrations of more than 200 brand-name electrical appliances. As in the past, booths were sponsored by distributors or manufacturers and manned by retailers and their salesmen. As a result of this contact between the San Diego County buying public and their appliance dealers, the dollar volume in appliances in the area was expected to be increased more than the one million dollar boost that was evidenced last year.

While the public's interest was stirred by the television displays, there was no lack of attention to white goods and traffic appliances — many dealers sold their complete allotments of refrigerators and washers during the first three days of the show.

Topping the long list of promotions used by the bureau to bolster attention, was the presence of Mrs. America of 1949 (Mrs. Frances Cloyd of San Diego) as official hostess for the show. Mrs. Cloyd appeared on the stage three times daily, and assisted Bureau Manager J. Clark Chamberlain in selecting the winners for the large volume of prizes, supplied both by the show committee and by participating distributors.

The bureau's show committee consisted of O. G. Thompson, chairman; Lee Bornstein, Gene Cramer, E. W. Meise, George Porter, Bob Redfield and Ed Reed, with Secretary-Manager J. Clark Chamberlain.

General view (top) of one of the three rooms used to house the 12th Annual Electrical & Home Appliance Show, put on by the San Diego Bureau of Radio & Electrical Appliances. San Diegans saw official show hostess, Mrs. America (center), over John Bainbridge's KFMB-TV program, with show committee members, Clark Chamberlain, Ed Reed and Bob Redfield. White goods (bottom) shared the spotlight with television displays. Transparent models, like this Kelvinator, got extra attention



Dealers shown 1950 Crosley Shelvador line on the stage

Only a Little Less Than Uncle

WITH a spectacular, tradition-busting start, Crosley aims to sell itself up into top position in the appliance business in 1950. W. A. Blees, who learned strategy in the automobile business in Los Angeles, made no secret of this ambition in refreshingly frank press conferences on a tour of the West with the 1950 Crosley line show last month. Blees and a new team seem to have moved into dynamic leadership of Crosley division of Avco. Like Patton, Blees appears to believe in a mobile (business) warfare for the market. Hence, 60 days before most manufacturers do so, Crosley sprang its 1950 line. It took a huge road show on tour to present it to distributors and dealers so that they could move into the Christmas season with 1950 models.

The big show hit Seattle first, where 400 dealers turned out on a Sunday to hear Blees, vice-president and general sales manager, and a troup of factory personnel, see the new line displayed, hear its sales features outlined, learn of its advertising artillery support and the "atomic bomb" of a two million dollar give-away contest.

With Blees were V. C. Havens, ad director, R. K. White, promotion, M. R. Rodger, Western division assistant sales manager, Tom Mason, sales promotion, Wayne Smart, sales training, Inwood Smith, refrigerator product manager, Thoben Elrod, freezer manager, Charles Stoup, kitchen cabinets and sinks. Regional manager for eight Western states, Charles E. Germaine, and regional staff, Charles Alden, Paul Pierson, Rolph Stoddard, William Harsh, Wilma Sledge, H. E. Melody and Dick Flounders also made the three Pacific meetings, Seattle, San Francisco and Los Angeles. Attendance at San Francisco Veterans Memorial Auditorium was 1,200; at the former Earl Carroll Theater, Los Angeles, 1,000.

Distributors participating in the three Western meetings were: Seattle—Commercial Appliance Co., host; General Distributors Inc., Spokane; Great Falls Paper Co., Montana; Crosley Distributing Corp., Portland. San Francisco—California Electric Supply Co., host; Western Supply Co., Salt Lake City. Los Angeles—J. N. Ceazan Co., Los Angeles and San Diego; Appliance Distributors, Tucson and Phoenix.

Beside the new models of the Shelvador refrigerator, featuring more storage space and greater accessibility to contents and a $40 price range reduction, Crosley announced entry into the all-steel kitchen equipment, electric water heater, disposal and full line of home and farm freezer fields. Eight new refrigerators were shown. Even a white kitchen radio was featured.

Strategy in bringing on the 1950 line early was explained by Blees as follows: "There is no reason refrigerator business should fall off so sharply in the fall and winter months, for refrigerators are household necessities. People must be waiting to buy next year's models. We feel we can offset this decline and stabilize production. We expect to secure 25% of our total year's business during this three-month period."

Blees believes business will be fine in 1950 and beyond. He bases this on the coming distribution of veterans' insurance funds, the approaching political year when the administration must keep business good and the still unfilled need for appliances and replacements. He was very frank in saying the boom could not go on forever. "You can't go on kiting checks and not go bust," he said, "but there are several years of good business before that. Only 20% of Americans are satisfied with antiques. Others want new things. Pensions have taken away the fear of old age. There are more people, higher wages, more in savings and bonds, more employment.

"There never has been a time in America when you can't sell goods when you work hard at it. I'd rather have a salesman who is willing to work 12 hours a day than an expert who works only two." Blees also counts on the public's admiration of a challenger, an underdog who assails the place of the top dog, to help Crosley win its way up there.

As for the "big give-away," Blees said that, since this seemed to be the fad, the public yearns for something for nothing, as evidenced in radio give-away shows, social security, welfare state. So Crosley decided it would run second only to Uncle Sam as a give-away sponsor.

In Los Angeles the Chamber of Commerce gave Blees its annual award for marketing merit for his spectacular selling program.

● THE BOARD OF DIRECTORS of the Construction Industries Exposition and Home Show of Southern California have announced the appointment of CARL F. KRAATZ as executive manager of the 1950 Home and Building Exposition in Los Angeles.

● APEX ROTAREX Corp. in San Francisco has added WESLEY FOLKMAN and GORDON ANDREWS to its staff.

Doorbell Selling Revived

ALTHOUGH there has been much lip service given to the profitable door-to-door selling technique, few in the appliance business have done much about taking it out of its neglected state. General Electric Appliances Inc., southern California distributor, Los Angeles, is one of the few trail-blazers to experiment with a real house-to-house campaign—first on its portable dishwasher. Thus far it has been a rewarding venture. In two months 75% of G-E's dishwasher stock was sold to dealers and 80% of the dealers' stock placed in customers' homes.

Spearheaded by its general manager, S. B. Maher, G-E first sent out a questionnaire to find out if its dealers needed help getting and training more salesmen, what remuneration they would offer. Results showed that dealers wanted help, would in some cases even be willing to pay on a salary plus commission basis. With this knowledge G-E ran a classified ad in the Los Angeles Times under the G-E name. More than 200 applicants answering the ad were channeled for interview and hiring to nearby dealers, depending on where they lived. Dealers who had signified interest in the program agreed to pay the applicants a minimum of $5 a day during the training school period.

G-E set up a weekly training school for both old and new salesmen with top-flight factory and distributor people putting on the sales and product training courses. Crew leaders were picked from about 90 prospective salesmen who attended the classes. Forty-five sales people were hired, among them two women.

Although dealers were enthusiastic about the campaign G-E discovered that the average dealer still shudders at the idea of getting back to house-to-house selling and that frequently he doesn't know how to go about organizing crews to do the job. Consequently one of the biggest problems was to "condition" dealers. G-E found that dealers often discouraged the salesmen whom he sent out. Often a dealer pulled new salesmen, who had just completed the dishwasher training school, off the dishwashers and put them on hotter items—television, for instance. Small dealer meetings called by G-E to review the prewar door-to-door techniques and plot new ideas did much to alleviate this problem.

In the course of its experiment G-E has learned these important facts about door-to-door selling of appliances:

1. Good salesmen can be had but they must be handled correctly by dealers.

2. The ten-day free trial is the most effective sales technique because it not only gives the customer a chance to use the appliances, but gives the salesman an excuse for frequent visits and an opportunity to see what other appliances are needed.

3. When a dishwasher is sold in a dealer's store without a home trial, a demonstration should take place in the home after the sale to be sure the customer understands how the appliance works.

Sales training techniques on door-to-door selling are explained by Bill McCall, left, General Electric Appliances sales manager in charge of dishwashers. Crew leaders for campaign picked from this class of potential salesmen

4. Often a demonstration of a portable dishwasher has led to the sale of a major appliance.

5. Salesmen's compensation is important. G-E advised its dealers to pay a minimum of 8% commission. Some dealers discouraged salesmen by giving low commissions. Ten per cent was about the maximum.

G-E admits it's not all smooth sailing in using the door-to-door technique. They encountered such problems as these:

1. About 50% of the applicants for salesmen's jobs backed out immediately when they learned it was a house-to-house campaign.

2. Crew leaders are a chief problem. Turnover is high. Out of every ten salesmen trained, about two remained when the course was finished.

In spite of these problems, G-E Appliances has proved that the good old-fashioned house-to-house selling can bring big results. The ice is broken, and for G-E the doorstep method is here to stay.

IEA Kitchen Promotion

People in Salt Lake City heard a lot about all-electric kitchens when the Intermountain Electrical Assn. set out to stir up business with an all-electric kitchen promotion recently. IEA's biggest attraction was a $1,500 electric kitchen awarded through a limerick contest and subsidized by local distributors and Utah Power & Light Co.

Supported by the Utah Home Builders Assn. and the Salt Lake Tribune and Telegram newspapers, the contest was conducted in connection with National Home Week. Fifty model homes were open to the public during the promotion, giving dealers and distributors an opportunity to display their electrical appliances. Each home featured two placards, one telling the consumer how to register and qualify in the contest. Attraction-getter was that one clue to the answer of the contest was to be found in several of the homes. The other placard advertised the 40-page Kitchen-izer's Digest, available at dealers' stores. Wholesale members of IEA were provided with display space for their kitchen appliances at the Salt Lake Tribune-Telegram auditorium.

Several showings of *The Constant Bride*, a sound technicolor film extolling the all-electric kitchen idea, were presented each day of the campaign at the Tribune-Telegram auditorium. In order to qualify the contestant had to have his entry blank stamped showing that he had seen the movie.

Utah Power & Light Co. cooperated with a barrage of advertising featuring all-electric kitchens on their utility bills, billboards, newspaper, radio, television and car card ads.

● LEON P. HOVIK of Salt Lake City has been appointed a member of the sales staff of the electrical division of Olin Industries Inc. With headquarters in Salt Lake City, he will sell Winchester-Bond electrical products in Utah, Montana and central and eastern Idaho.

● CARL L. BLAKE has been appointed regional sales representative for Hamilton automatic clothes dryers for the territory including Montana, Wyoming, Idaho, Arizona, Utah, Colorado, New Mexico and western Texas.

ELECTRICAL WEST

Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

January 1950

Never mind the crystal ball stuff, any clear-headed business man can foresee a year of political doubletalk to try to woo votes and blame somebody else but none of it can stop natural laws from working. Steel and coal and labor demands will bring higher prices that can't be talked down by politicians. There'll be lots of bleeding heart stuff for the small businessman and talk about repeal of excise taxes and hitting the coops with equal taxation but don't let it kid you. Sure, keep an eye on Washington and make your voice heard when needed, but where you'll either go broke or make a good living is right among the home folks. Give them most of your attention.

No predictions

Example of taking full advantage of a local situation: A fire burned down the shanty of San Diego County's oldest Indian, Joaquin Paipa. Not all the bureaucracy of Washington or Sacramento could figure a way to get him another by welfare state methods. But the enterprise of S.D. Bureau of Radio & Electrical Appliances and its dealer and distributor members is doing it with a huge electric blanket and bed covering promotion. For each one sold a dollar goes to the fund to rebuild Joaquin's house, 25¢ from the dealer, 25¢ from the distributor, 50¢ from the utility. Began Jan. 3, runs through February and with wonderful tie-in publicity over radio, TV and press, real Indians participating, they expect to raise over $1,000 for a new shack.

Indian tepee

Fact is, Joaquin Paipa, reputedly over 100 years old, will be a feature at the Annual Winter Conference of Bureau of Radio & Electrical Appliances at the convention center, Balboa Park, San Diego, Jan. 27. More room will enable all salesmen and wives to attend, as well as dealers. Among featured speakers will be J. K. West, vp of RCA, on a TV subject; W. P. Volberg, Federal Reserve Bank on consumer credit. There will be a distributors' panel as well as the dealers' and salesmen's, so stimulating last time. C. H. Ripps of Hamilton will unfold dryer sales potentials. A big name from one of the big manufacturers will also be starred. Plans for the April refrigeration, home freezer and frozen foods fair will also be disclosed.

Another whiz bang program

Sears Roebuck will have national distribution for a new automatic dishwasher and a sink and dishwasher by April, says Tide, made for it by Heintz Mfg. Co., to sell at about $200, with sink $280.

Sinko too

Deepfreeze has abandoned the single line policy it championed for 11 years. In a deal with Crosley it will supply the latter with freezers and Crosley will make a line of refrigerators and L&H will make its ranges and refrigerators with a Deepfreeze name. With a full line it hopes to get bigger, stronger dealers.

Unfreeze the line

International Harvester too likes the refrigeration business and will add new sizes, making a total of four models, from $214.95 to $299.95 for 7.4 to 9.5 cu.ft. sizes, with from 35 to 50-lb. frozen food storage. — New crop

And Zenith will get a hearing on its Phonevision from FCC in January. It is asking to try it in Chicago for a three month test. Phonevision works with telephone company furnishing missing wave bands on a metered basis, customers paying for TV programs that way. FCC also will hear and see comparative color tests Feb. 20-27. A Westerner, Color Television Inc. of San Francisco is in the three-way battle too. — Metered TV?

RCA-Victor has broken down. Not only will it make record changers for all three speeds but has just announced it will make some 33 rpm. long-playing records as well. It won't quit the 45's or 78's, as each has its adherents and purposes, but it had to meet the uninterrupted-long-playing demand. — Triple too

San Francisco Winter Market's annual radio-television and appliance trade dinner on Feb. 8 will have two big name speakers — Fred D. Ogilby of Philadelphia, vp of the television and radio division of Philco; and W. Paul Jones of Evansville, Ind., president of Servel. Dinner chairman will be G-E's commercial vp, Ray W. Turnbull. Market Week runs from Feb. 6-10 in San Francisco, from Jan. 30 to Feb. 3 in Los Angeles. — Mart speakers

Gouch Industries Inc., Philco distributor, has opened a new plant at 828 West Anaheim St. in Long Beach, Calif., complete with a large new warehouse and display room. — New plant

November was the biggest TV sales month to date in San Francisco. Dealers made 2,176 sales — a 23% increase over October, with 205 dealers reporting as compared to 180 during October. To date total estimated sales for the PG and E territory have reached 22,000. . . In November the Los Angeles area reported 51,594 sales, bringing the total to 302,635. — Sales mounting

James M. Scalas, former general sales manager of Leo J. Meyberg Co., San Francisco, is the new district manager of Zenith for the Northwest territory. Milton G. Sanders takes over as general sales manager for Meyberg. — Changes

Fair Trade has no friend in new Attorney General McGrath. He has come right out against it. It seems the Administration is all for farm price supports and minimum wages, but fair prices on advertised items, no soap. What price all this "small business" tear shedding? — Crocodile tears

Frank Edwards Co., San Francisco, has acquired the northern and central California distributorship for Stewart-Warner Corp., radio and TV manufacturer. — Franchise

Radio Products Sales Co., Los Angeles, has exclusive distribution of Arvin radios, TV receivers and appliances in Los Angeles. — Appointed

Thomas R. Shellworth has been transferred from the advertising department of Frigidaire division, General Motors Corp. at Dayton to the Frigidaire Sales Corp., Oakland, as instructor of the Oakland appliance school. — Transfer

Kelvinator is bringing out its 1950 range line with two deluxe automatics, two apartment house and two 29-in. width models, priced from $154.95 to $309.95. Its new refrigerators will be topped off by a series of four full-length door models, an 8 cu.ft. with frozen food chest and an 8.6 cu.ft. model, priced from $189.95 to $449.95. — 1950 line

Calapco's "Back in Action" sales program is going great guns. Sales hit about 105% of the increased quota for the first month. Appliances already sold will boost Calapco's revenue during the year by $77,850. Dealers in the central division, with the help of employee prospects and door-to-door salesmen from the utility, chalked up the best record during the initial month. — In action

Jack Lacy Sales Clinic is coming to San Francisco, Jan. 16-20, sponsored by the San Francisco Sales Managers' Assn., and endorsed by the Northern California Electrical Bureau. Full course of five sessions costs $15. — Sales course

In Denver Ray Jones Washing Machine Parts & Repair Co. is putting out a free monthly bulletin, "Flash," filled with useful information for retailers on the service parts industry. Contains service news and hints, answers to service problems and displays of washer parts. — Flash

Claude Edgren of Colfax, Wash., heads the Inland Empire Electrical Dealers Assn. for 1950, replacing R. W. Burch, who continues on the executive committee. Stanley Dansow, Spokane electrical dealer, is vice-president. Other officers remain the same — F. A. Tool, secretary; W. J. Maghan, treasurer; Robert L. Wilkinson, executive secretary. — New leaders

Philco is introducing its 1950 TV line with a 12½-in. table model in walnut cabinet, featuring a built-in aerial system. . . DuMont is putting out a 15-in. TV console, with AM-FM radio and three-way record player at $645. Says allocation of its receivers will continue indefinitely. — TV news

To protect TV receivers in transit, for home demonstration, etc., Webb Mfg. Co. is putting out adjustable protective covers, available in four models to fit all size radio and TV sets. They are made of water-repellent canvas, heavily padded and lined with white flannel to protect finishes. — Protective covers

"Here's How To Be A Television Expert" is the title of a 23-page, two-color booklet put out by Motorola. Gives an elementary explanation of TV, its production, reception, history, etc. — TV breakdown

Motorola is offering its distributors four advertising movies to use in promoting the company's 1950 radio and TV line. Each film runs 50 seconds with 10 seconds allotted for the dealer's signature. — Promotional movies

Colorful Kodachrome brochure put out by Parkwood Corp. describes the new Parkwood Decorative—a permanently finished laminated plastic material, suggesting its use as a finish for radio and TV panels and tops. — Plastic finish

Cornell-Dubilier Electric Corp. says its new all-band conical TV antenna can be assembled and installed in five minutes. Comes in two models, a 2-bay package, complete with 8-ft. mast, listing at $22.95; and a single-bay package without mast at $10.45. Separate wave-jumpers for stacking retail at $1.50. — Conical antennas

Magic Booklite is a little 7-watt lamp which clamps on to any book or magazine, lights automatically when the book is tilted forward into reading position, turns off when the reader dozes off or lets the book drop. Has an 8-ft. cord, plastic case and comes in a variety of colors. Retails around $1.50. Made by Eagle Electric Mfg. Co. Inc. — Magic light

Celebrating its centennial anniversary, **Landers, Frary & Clark** will run a year-long advertising campaign tied in with new developments in the **Universal** appliance line. — Heavy ads

Magnavox is making a radio-phono console model, with mahogany 18th century cabinet, plus Add-A-Television feature. TV chassis, with 12½-in. tube, can be installed at any time. Priced at $275 without TV, $469.50 with. — Add TV

Florence Stove Co.'s Western division manager C. P. Connelly, Jr., attended the company's recent series of sales conferences at the Gardner, Mass., factory to discuss sales policies for the year and preview the new **Florence** range and heater models. — Goes east

Lewis & Conger says that entries for its fifth annual **home safety awards** must be in by the end of January. — Deadline

Tyler Fixture Corp. has five models in its new line of **HARDER Frees farm and home freezers**, including three uprights ranging from 12-30 cu.ft. capacity. — Five freezers

"**Kitchen Planning Standards**" is an eight-page circular offering suggestions for kitchen planning, complete with a "score sheet" for rating any kitchen. Prepared by the **Small Homes Council** at the University of Illinois. Single copies can be had free of charge by writing directly to the council at Urbana, Ill. — Free booklet

All-industry drive on electric housewares will break with **National Electric Housewares Week** set for **April 14-22**, as the initial spark of the new program of the **Electric Housewares Section** of **NEMA**. Will start with four-color, full-page ads in national magazines. Complete kit of materials will be made available to dealers and department stores through their electric housewares distributors. — April drive

New **Vornado** products of **O. A. Sutton Corp.**—The **Turnabout**, a table with built-in air circulator on swivel mounting; pedestal fans of adjustable height, three speeds; window fans with swivelling fan head for intake or exhaust use, adjustable to fit most window sizes. — New ones

Hotpoint's latest **ironer**, the LR-4, is a fully automatic, cabinet enclosed model with automatic knee control. Has a 26-in. roll. — Ironer

Lightolier is putting out a new series of lamps, lighting fixtures and Decoralites for hotels, hospitals and institutions. Designed in metal and run the gamut of styles and sizes. — Institutional lamps

Allied Factors, space 919-A at the Merchandise Mart, San Francisco, is the newly appointed representative in northern California for **Fresh'nd-Aire Co.**, division of **Cory Corp.** — Rep.

Packard-Bell's latest **TeleCaster** has a 16-in. picture tube, built-in antenna; cabinet is mounted on concealed casters for easy moving. — Late model

Harry V. Dodson, Harold Johnson, Glenn Hagadorn, W. L. Friend, R. A. Buckby

All Join in Lighting Show

A lighting show, conceived by the electrical inspector, sponsored by the electrical union, participated in by electrical manufacturers, distributors, utility and contractors, is something new. Such a show was staged in Santa Barbara, Nov. 18, at the Barbara Hotel, to invited guests—architects, home and building contractors, school officials, public officials. Harry V. Dobson, chief electrical inspector of Santa Barbara, thought up the idea as a means of getting the entire industry together on a friendly and constructive project.

Sponsors were the Local Union 413, International Brotherhood of Electrical Workers. Harold Johnson, president of the local, presided at the meeting. Reid Prince, lighting consultant for Southern California Edison Co., arranged for the program. The late George M. Rankin was to have addressed the audience. After his death it was arranged that three lamp company men do the speaking. Richard A. Buckby, Westinghouse Lamp Division; F. G. Hagadorn, General Electric Lamp Department, and William L. Friend, Sylvania Electric Products, each presented a segment of the program. Buckby covered fundamentals of light and sight; Hagadorn, light sources, and Friend spoke of applications. The new Santa Barbara Chapter of NECA also participated.

Showing lighting equipment in an exhibit at the rear of the meeting room were: Associated Wholesale Electric Co., Sunbeam Lighting Co., equipment; Gough Industries Inc., Sylvania Electric Products Co.; Graham Reynolds Electric Co., Benjamin Electric Mfg. Co., Smoot-Holman Co.; Los Angeles Wholesale Electric Co., Guth Co.; Westinghouse Electric Corp.; Hollywood Wholesale Electric Co., Pryne & Co., Mitchell Mfg. Co., and Day-Brite Lighting Inc. Both the show and the program were attended by more than 100 people.

TV Centers

Television centers are a merchandising idea that seems to be flourishing. Salt Lake City now has three of them, the first and most spectacular opened by Schubach Jewelry Co. at 850 S. Main St., Salt Lake City. This is entirely separate from the main Schubach store in the shopping area.

The television center will later be equipped with a theater-type marquee to advertise special TV programs. It now carries neon signs advertising the five makes handled, Admiral, General Electric, Zenith, RCA and Motorola.

Inside the building, booths or separate "theaters" are arranged along each side. In each of the booths or "theaters" is one make of TV sets and visitors can be seated before the receivers. The place is open from 3 p.m. to 10 p.m. during the television broadcasting from the two local stations.

At the opening Schubach's sponsored a full hour variety show of live entertainers, telecast from the KDYL Television Playhouse. Then Hoffman sponsored a similar show in the center, and 250 people crowded in to see.

The other two similar set-ups are Television City Inc., at 9th East and 4th South, on a somewhat smaller scale carrying only one make of TV set; and the Royle Radio & Appliance Co., which opened a television theater in the 500 block on South State. All of these are outside of the main shopping district, providing more ample parking space. All of them are open during the broadcast hours only.

Suit Is Significant

Whether franchises are worth the paper to print them may be one of the important decisions in the Salt Lake City suit now being tried in a federal district court. Nation-wide significance attaches to this case because of the test it gives to the validity of a manufacturer's franchise as well as to his Fair Trade list prices.

The case is being brought by Uptown Appliance Co. against three distributors, four dealers and four individuals connected with them, charging a conspiracy in restraint of trade. The specific charges are that the group conspired to put the plaintiff out of business, and the bill of particulars indicates that it will also be a challenge to the validity of manufacturers' franchises.

The action resulted after defendant distributors refused at first to supply more merchandise to the plaintiff company when it broke its franchise agreement as to Fair Trade prices. The plaintiffs charge that the dealers involved conspired to demand the enforcement of Fair Trade and franchise requirements in order to force them to go broke.

Because of the carefully selected business prominence of the defendants, this case has drawn to it prominent legal talent on both sides. Defendants are Salt Lake Hardware Co., Flint Distributing Co., Graybar Electric Co., Z.C.M.I., The Paris Co., Reed Bigelow, Royle Radio & Appliance Co., Robert Nevins, Orville Coon, Frank Warren, Leland Flint.

Named as confederates in the case are the Intermountain Electrical Assn., Jules Dreyfrous, H. H. Bennett, Ed Morrow, Royle Daynes, Allen Searle, Standard Supply Co., E. M. Royle and G-E Supply Corp.

The case will be tried in the Third District Court commencing Dec. 27 under Judge Joseph R. Jeppson.

● Oakley Electric Co. of Boise recently bought the Appliance and Record Shop from Fifer's and moved to that location at 213 N. 10th St. Oakley's had been at 11th and Idaho for a number of years, but had moved its automotive and repair shop to another location at 817 Grove St. earlier in the spring. The downtown store gives it a better shopping location for the appliance and record business.

E. R. Cornish holding estimating class for Spokane NECA

GIVE THE NECA ITS DUE

"YOU have been critical of NECA. Now why don't you tell us what's good about it. Give the devil his due." Loyal members and hard workers in the National Electrical Contractors Assn. have asked just that, knowing from personal experience that a great deal of good has been done, much progress made.

It can be said truthfully and with pride that NECA has done more, made more progress in the past year than in the previous ten, so far as the West is concerned. And though he does not claim it for himself, the reason is to be found in the sincerity and energetic work of E. R. Cornish, director of the Pacific Coast office. Prior to his appointment, District 6 had suffered from the inadequacy and ineptness of two successive NECA field representatives selected more for their labor union background than their knowledge of or ability to help the contracting business. Cornish, however, had been an estimator and a contractor and knew contracting as a business. He has been trying devotedly to get all 565 of the district's members to conduct contracting as a *business*. His tireless efforts are bearing much fruit.

With new leadership from its field representative, the chapters too have been able to expand and do more for their members. New chapters have been formed and new areas served. Even the old-time chapters, which prior to this year were more inclined to stay aloof as local associations, scarce wishing to admit affiliation with NECA, are now inclined to take pride in it and to become known as chapters of it rather than separate entities.

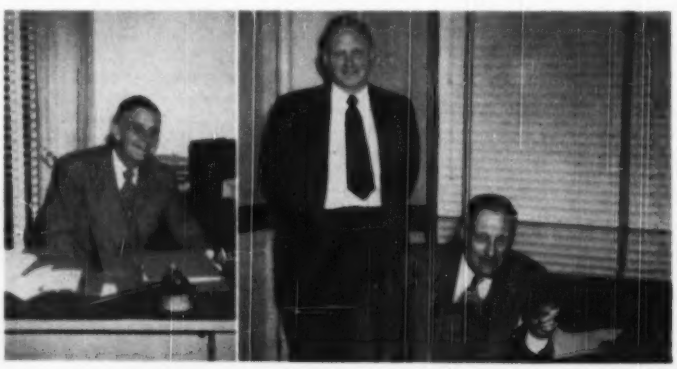
A strong and beneficial outgrowth in California has been the formation of a conference of chapters to exchange information relative to demands made upon individual localities for extra wage, working condition or fringe benefit proposals. This informal conference has been far more effective than the many previous attempts at a state association, not only in labor relations exchanges but as regards legislative trends, tax matters or any other mutual interests.

In the Rocky Mountain region a similar development is taking place. It was pioneered by the capable and intelligent work of Don Larson, chapter manager of the Rocky Mountain Chapter, and by G. A. Howarth, Utah chapter manager. During the year a new District 8 has been formed for the states of Colorado, Wyoming, Utah, Idaho and Montana, and a field representative, Jack Fisher, appointed to serve it. A new chapter in Montana has just resulted from this activity and one may be formed at Pocatello, Idaho, soon.

A quick summary of the work done by Cornish, representing the district office, in cooperation with the chapter managers and the contractors who serve as officers of NECA chapters, indicates what an energetic and progressive organization NECA is becoming. The morale in the district, so low in the fall of 1948, is now high. There is less talk of separate associations, more of joining NECA. Membership growth from Jan. 1 to Oct. 1 increased 118 or 26%.

New chapters have been organized at Modesto, (Central Valley Chapter); Santa Barbara, (California Central Coast); Fresno (East Central California), reorganized from a branch of

Heydon Lane Majerus



Goold Welsh Mrs. Lowe Penn Kramm Goulart Bronson

Northern California Chapter; Puget Sound Chapter reorganized out of Seattle Chapter and extended to serve the entire Puget Sound area; California-Nevada Line Constructors Chapter. The San Francisco Electrical Contractors Assn., through cooperation of W. J. Varley, its manager, has brought in the Peninsula Electrical Contractors Assn. of San Mateo County, and has revised its dues structure for the San Francisco Chapter. Meetings are in progress in Santa Clara and San Benito counties looking toward a chapter in San Jose. The San Diego Chapter, under enterprising manager Pete Montgomery, has enlarged and has set up a branch in Imperial Valley. The Portland Chapter has brought in Longview, Wash., contractors as a division of that chapter.

This new growth in chapters, with new managers, has necessitated a program of manager training and assistance. Cornish prepared a chapter manager's manual as a guide and has counseled with and trained the new managers at San Diego, Pete Montgomery; Portland, Laurence Rodgers; Fresno, Noyes Alexander; Modesto, Robert Walker; Santa Barbara, Will Pregill; Puget Sound, John Majerus; and Oakland, Ernest Kramm. Besides these, Robert Higgins, a young engineer, was assigned to the district as field representative and Cornish has trained him in this work.

Grogan Rodgers

Labor relations still took much of the time of Cornish and Higgins and chapter managers, as well as of the officers and committeemen of various chapters. But better relations were established between the district international office of IBEW and the Pacific Coast office of NECA. Negotiations were handled in Santa Barbara County, participated in at Modesto, Ventura and San Luis Obispo. Majerus in Seattle assisted in settlement of grievances at Grand Coulee, Everett and Tacoma; Cornish in Imperial Valley, Fresno, Stockton, San Diego, Portland and Spokane. The tangled status of the Employees Benefit Board was straightened in Santa Clara, Seattle and other localities. Higgins made a study of and compiled a master cross reference chart showing graphically the wages, working conditions, contract provisions of all the union agreements in the area, a valuable aid in chapter negotiations.

Outside of labor relations there has been more done in the past year than in many years. Being thoroughly sold on the need for sound estimating and business practices, Cornish initiated activities along these lines that are now being picked up by NECA on a bigger scale nationally in a newly announced "vestibule training" program soon to be made available. Cornish began by offering and holding educational meetings on estimating procedures and methods in all parts of his district. So successful were they that District 5 in Texas asked for him to put on a similar program. He gave 14 classes in that region.

To enlarge the scope and make this available to more contractors, he started a correspondence course on estimating and to date 523 contractors have enrolled. He prepared the material, mailed lessons, processed the returned papers. Of these 523, 114 were from the Texas district. Night school classes in estimating were also started in San Francisco and Oakland.

Larson at Denver has been similarly active in promoting constructive and educational work. He brought Ray Ashley, well known estimator and engineer from Chicago for a series of classes and for meetings with architects and engineers to acquaint them with the needs for clear specification writing. Classes in electronics and power requirements have been held with the help of the Opportunity School and the Public Service Co. of Colorado.

The chapters themselves have each carried on programs comprising a variety of activities. The newest chapter, in Montana, staged a state-wide meeting at Helena, Dec. 10-11 at Placer Hotel. Its manager is Dave White, whose office is in Billings. Rocky Mountain Chapter has just had a long struggle over a new electrical code for Denver; has sections in Colorado Springs, Pueblo and Cheyenne; recently moved its offices to 26 Shuey Bldg., Denver; participates in Rocky Mountain Electrical League contractors' division. Utah chapter has been assisting contractors in the Pocatello area to form a chapter or a section and to handle relations when the big atomic project gets into full swing.

Puget Sound Chapter has been increasing in membership steadily and Majerus has been energetic in handling contractors affairs relative to state legislation, labor relations, government relations. Estimating classes have also been held. In Spokane Paul Heydon is manager both for the Spo-

kane chapter and the Northwest Line Constructors. Early last month a big meeting was held with Bonneville Administration and others to clear up policies relative to line contacting. Larry Rodgers, manager of Portland chapter, has prepared lists of fees, wages, conditions in all surrounding towns.

All California chapters have been very active. San Francisco held a big meeting, Dec. 6, inviting contractors from the entire Bay Area to hear reports from NECA officers, its own governor, C. A. Langlais, Manager Varley, and Past President Clyde Chamblin report on the Houston convention and NECA's business education program. Los Angeles Chapter honored the outstanding apprentice in District 6, Fred J. Ortiz, at its annual meeting in December. Warren Penn is its manager, Jack Rollins his assistant. San Diego Chapter, beside organizing a branch in Imperial Valley, helped it with an electrical code for the county, has introduced a course on materials into its apprentice training program, taught by E. C. Phillips of Coast Electric Co. Other chapters have worked on ordinances, apprentice training, establishment of bid registration, bid depositories, industry relations, adequate wiring promotion, lighting and electrical shows, local advertising.

All in all, there has been lots good about NECA, and with some recent changes voted at the National convention, the whole outlook is bright for 1950.

EMEA

EMEA of Northern California closed its 1949 activities at a Dec. 15 meeting with an illustrated talk on *Practical Aspects, Design and Application of Alternating Current Motors*, by G. R. Brooks, Pacific regional electrical engineer of Allis-Chalmers Mfg. Co., San Francisco.

EMEA of Southern California predicts that its fourth annual Southern California Industrial Electrical Show will break last year's record exposition. Scheduled at the Shrine Convention Hall in Los Angeles from March 15-18, EMEA reports that a flood of space reservations have already been received. The show will be open from 2 until 10 p.m. each of the four days. Frank J. Rohring, Southern California Edison Co., and EMEA director, is in charge of this year's show committee.

At the group's Dec. 14 meeting Otto Neumer, Western resident engineer of SKF Industrits Inc., and M. M. Patterson, director of sales for Master Lubricants Co., were the principal speakers. Neumer gave an outline of maintenance of ball and roller bearings in electrical machinery. Patterson discussed grease lubrication of ball bearing motors and generators.

Jussel Larson

Howarth Laub

Fourth National Farm Electrification Conference was held at the Hotel Stevens in Chicago, Dec. 20-22.

Sixth annual Adequate Wiring Discussion-Conference has been announced for Feb. 16-17 at the Statler Hotel in St. Louis.

Walton Rodgers

Oregon Contractors Form Association

Formation of an Oregon Federation of Electrical Contractors came as a result of a large meeting of contractors at Salem, recently. A preliminary meeting in August at Eugene had brought the desire for a state-wide gathering. James J. Walton of Salem at that time was selected to arrange for such a gathering in Salem. He was president of the Cascade Electrical Contractors Assn. of Salem as well as a member of the NECA Northwest Line Constructors Chapter.

The other associations participating in the meeting were the Lane County Electrical Contractors Assn. of Eugene, the Pacific Electrical Contractors Assn. of Portland and the National Electrical Contractors Assn. Portland Chapter, and Line Constructors Chapter.

As a result of discussions during a two-day meeting it was decided to form a federation of associations, both independent and NECA, with representation on the board from each, plus a president, secretary and member-at-large. James J. Walton of Salem was elected president; I. W. Rodgers, secretary, and Walter Lance, Redmond, member-at-large. Each of the organizations is to name its own representative.

At the opening luncheon the 145 contractors, together with inspectors, wholesalers and civic officials, were addressed briefly by Governor Douglas McKay, the mayor of Salem, Senator Lamporte, who had introduced the electrical bill at the previous legislature, the president of the Chamber of Commerce of Salem. William R. Volheye, Oregon's chief electrical inspector, spoke, saying he had suggested such an organization years before. He then discussed details of changes in the Oregon electrical law. These had not previously been heard by most of those present. W. S. Kimsey, Commissioner of Labor for Oregon, spoke on state apprenticeship activity and asked contractor participation in the program. The business manager of the local IBEW urged contractor participation in the pension program.

That afternoon at a contractors closed session the question of affiliation of the contractors groups was discussed and voted upon. Meetings are to be held about once a year or as needed to correlate matters of state-wide interest.

At the evening banquet a talk was presented by Henry Lehl, General Electric Supply Corp., as representing the viewpoints of electrical wholesalers in general.

Wright Cassidy Mayer Stalker Haller Miller

Idaho Contractors See Opportunities

IF every electrical contractor's business and jobs were as well organized as the program of the Idaho State Electrical Contractors Assn. conference, Pocatello, Dec. 2 and 3, it should be a highly successful business. Seldom has there been condensed into two short days so much pertinent and useful information about the contracting business as was heard by the 60 or so contractors and their industry associates at this conference. It had been planned carefully by President A. R. Woolley, Mountain Electric Co., Pocatello, and J. Carl Baldridge, secretary, Boise, for this purpose.

To pass on to contractors who did not attend or to supply reminders for those who did, it is well to report the most significant ideas and information in a similarly organized form. The program fell into four groupings: a first part dealt with the industry and business opportunities opening up in Idaho; the second part treated with people or factors affecting their business; the third heard from partners and associates; and the fourth sought to form a program as to where to go from here.

Opportunities for Contractors

Four speakers opened the eyes to Idaho's and the mountain region's booming growth.

L. C. Johnson, freight agent, Union Pacific Railroad, Pocatello, told how the primarily agricultural state of Idaho is fast becoming also an industrial region, where large-scale chemical and atomic developments will create needs for thousands of homes and much electrical installation. Meanwhile huge reclamation projects in the state and region will further spread the opportunities coming from intensive farming and farm electrification.

Gilbert Miller, manager, Westvaco Chemical Division, Food Machinery and Chemical Corp., Pocatello, described the new phosphate chemical industries in Idaho which by electric furnace reduction produce pure elemental phosphorous that is finding extensive use in water softening and detergents. He predicted that any products that can be produced in the East will eventually be produced in Idaho because of the richness of the mountain region in resources for the chemical industry and the supply of cheap hydro power and cheap fuels—gas and coal.

"Idaho and the Atom" was discussed by L. E. Johnston, manager, Idaho operations office, U. S. Atomic Energy Commission, Idaho Falls, who described the Arco atomic project as an experimental "breeder" station which it was hoped would help develop the first kilowatt of electrical energy from atomic energy. He discussed its purposes in power development and creation of a means of propelling navy vessels by atomic energy, then described the commission's contracting policy. Complex and intricate laboratory work generally will be done under cost-plus-fixed-fee by carefully selected contracting companies. Competitive bids for contracts will handle most of the general building work and outside work. A contract board has been set up to determine which method will be used in each case and to study the brochures and submittals of various contracting firms for the selection of bidders. Of the 21 contracts awarded so far, he said 19 had been awarded to Western contracting firms and invited all contractors who wished to participate in this type of work to write letters of application.

Why industry is moving westward and to the mountain region was graphically described by Orland Mayer, Idaho Power Co. "Why an intensive industrial development in this agricultural state?" asked Mayer. "For the same reasons that you have—to stay in business. Industries, with increased taxes, increased wages and decreased profits, are seeking ways to find new markets and get nearer to raw material sources. The state has two possible sources of new money—tourist and industry—and has concentrated to increase industrial possibilities of the state." He then showed the trend of migration of industry throughout history to regions rich in raw materials and predicted that nothing could stop this migration to the mountain region, even if it was desired. The region is already receiving a bounce from industries on the West Coast, where crowded conditions and other factors are driving them to seek new locations. Mayer pointed out what this would mean in opportunities for contractors to do more business in home building and industry and commercial installation and urged them to build up the electrical portion of the construction job by selling electrical control and many of the newer electrical conveniences. He urged contractors to tie in with their individual chamber of commerce industrial promotion programs to hasten this development.

These Affect Contracting

An architect, a general contractor, an insurance man, an advertising man and a utility man presented their points of view of conditions that affect the contracting business.

Architect L. E. Stalker, Idaho Falls, after complimenting electrical contractors as a group for causing less trouble in the building industry than all contracting groups and referring briefly to the prospects for new construction in 1950, indicated that both

NOW...Moloney

REVOLUTIONARY PRINCIPLE OF REACTOR SWITCHING

An entirely new and revolutionary principle of reactor switching is used in the Moloney Load Tap Changers. Through its use, there is no Switching Reactor (Preventive Auto) loss on half of the operating positions when operating half cycling, and no loss on *any* operating position when operating full cycling. Diagram shows how reactor halves are by-passed when Tap Selector Switch is in any "on contact" position. Elimination of reactor loss results in tangible savings in operating costs.

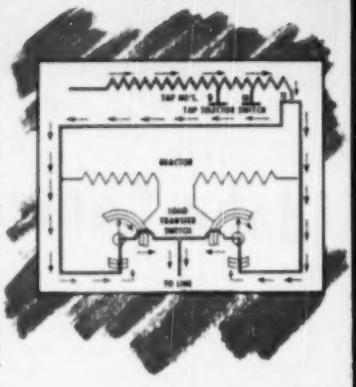


Diagram shows how Switching Reactor is by-passed to eliminate its loss.

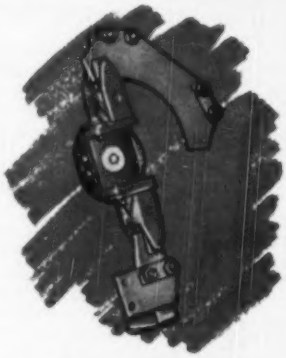
NO ARCING ON TAP SELECTOR SWITCH

The Tap Selector Switch on Moloney Load Tap Changers does not have to perform the dual function of breaking current and changing taps. A separate Load Transfer Switch makes and breaks the circuit, eliminating all arcing duty from the Tap Selector Switch, and making it possible to use longer arc clearances and highly accelerated breaker opening and closing speeds, with consequent increase in interrupting capacity.

Load Transfer Switch at upper left. Reversing Switch at upper right. Tap Selector Switch at bottom.

COMBINED SPRING-ACCELERATED AND DIRECT DRIVE LOAD SWITCHING

Highly accelerated opening and closing speeds are used on the Load Transfer Switches to minimize arc erosion. These high speeds are obtained through the use of accelerating springs. Although the spring materials used and stresses at which they are operated are such that almost indefinite life is assured, in event of spring failure, the tap changer will continue to operate in direct drive. This system combines the best features of spring drives and direct drives.



Load Transfer Switch, right, is driven by accelerating spring arrangement to provide highly accelerated opening and closing speeds.

Load Tap Changer!

DESIGN CHARACTERISTICS AND RATING

Moloney Load Tap Changers are designed to operate satisfactorily under the following operating contingencies:

1. Continuous full-load operation at any point in its operating cycle

2. Short circuits or grounds on systems to which it may be connected where the current may reach 25 times normal rating for 2 seconds

3. Recurrent short-time overloads or emergency short-time overloads as defined in the American Standards Association Guide for Operation of Transformers and Regulators, *making it possible to take full advantage of the full transformer capacity following partially loaded conditions or during times of low ambient temperature*

4. Reduction of control voltage up to 25% with sufficient torque for tap changer operation still developed by driving motor

5. Impulse, surge or transient voltages incidental to the operation of transformers, series transformers, or reactors

FEATURES

1. No reactor loss or voltage drop on full cycling positions

2. No arcing duty imposed on Tap Selector Switch

3. Longer arc clearances for load switching

4. High speed "make" and "break" on load switching with minimum shock from acceleration or deceleration of inertia load of parts

5. Combination spring-accelerated and direct drive

6. Low contact maintenance cost

7. Special arcing tips provided on Load Transfer Switch contacts

8. Contact materials selected to minimize wear from friction

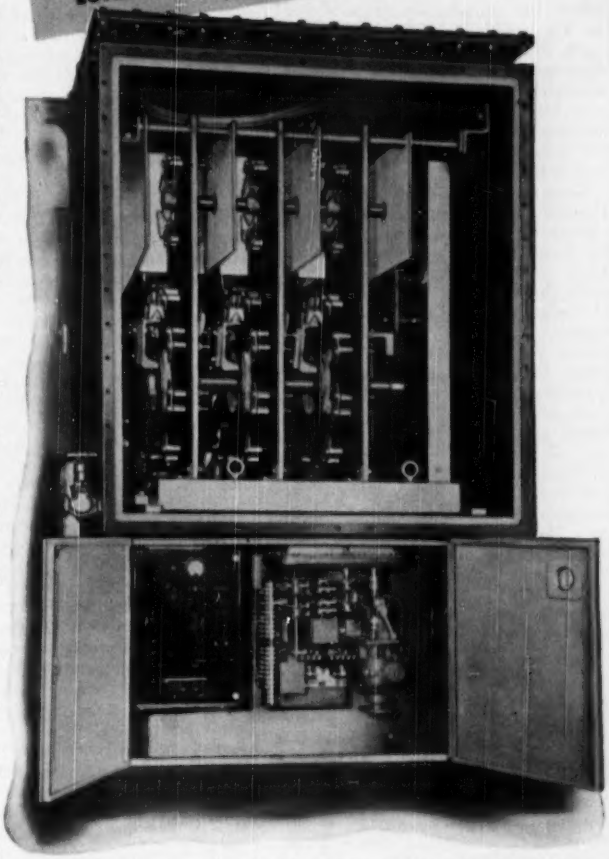
9. Position indicating, pilot switching, and mechanical drive limit equipment are solidly tied in with those parts requiring definite timing

10. Minimum space requirement, at high dielectric level, through the use of high insulating strength materials as combination mechanical supports and barriers between phases

11. Melamine bonded surfaces used in areas subjected to arcing or arc gases

12. All insulating surfaces are mounted in a vertical plane

MOLONEY QUALITY IS NOW AVAILABLE IN AUTOMATIC STEP VOLTAGE REGULATORS, REGULATING TRANSFORMERS AND LOAD RATIO CONTROL TRANSFORMERS



New Moloney three-phase Load Tap Changer with automatic controls. Tap assembly contains Tap Selector Switch, Load Transfer Switches and Reversing Switch. Motor drive and auxiliary equipment are at lower right. Automatic controls are at lower left. Moloney Automatic Control equipment features a super-sensitive voltage regulating relay and an electronic time delay circuit. A complete line of remote-manual and automatic controls and associated equipment is available.

MOLONEY ELECTRIC COMPANY

FACTORIES AT ST. LOUIS 70, MO. AND TORONTO, ONTARIO, CAN.

Another Superior **MOLONEY** *Product*

Write for Bulletin No. LTC-901 describing in detail the new Moloney Load Tap Changer with Automatic Controls.

contractor and architect are agents of the owner, or should be, although the competitive position of the contractor may sometimes make him feel as if he is not. Appreciating the desire of specialty contractors to get their bidding away from under a general contractor, he however emphasized the desirability of making one general contractor responsible for the entire job to the owner, rather than having to deal with a multitude of individual craftsmen. He felt that only some revisions of bidding practices could solve these problems, revisions showing a concern for the contractor's position of giving a price in advance for something that nobody has yet seen. He also said that the big gamble is in labor and how much it is going to perform, as the other quantities of a job can be rather accurately estimated. Stalker said the only way that fairness could be obtained would be for a development of fair play at all levels in the construction industry.

General Contractor Roscoe Cahoon, Pocatello, also commended electrical contractors. He said the entire industry these days is more concerned with labor than anything else, since contracts don't seem to make a difference to some organized labor leaders, no matter how well or thoughtfully drawn. He cited the demands for pensions, job insurance, severance pay, disability pay, guaranteed annual wage and vacations with pay, all of which must come from the costs of the job. Even the recent settlements in the steel industry have already been reflected in metal prices. Unions are creating an upward spiral for everyone. He urged spending of time on committees and in negotiations to "know where they are going." The success of all contractors in all fields, he said, would depend upon how they manage their labor relations.

Insurance man Roland Smith, Pocatello, warned that even though a businessman might never get a dime from the premiums he paid, insurance was a stabilizing force in the business and was necessary to protect the business from unexpected losses which could wipe out a man's entire assets. He described insurance hazards under three classifications and discussed the type of insurance available for protection in each. Losses of physical assets such as tools, buildings, appliances and automotive equipment, come from collisons, fire and theft. Comprehensive policies are available for automotive equipment and also protection of plants and equipment.

General liabilities, which often result in serious law suits, come from injuries suffered by people on business premises. The juries recently have been giving larger judgments, under the idea that attorneys get half of what they award, so they double the amounts. There is also liability for damage from the products that are installed or sold, such as water leakage, explosions, etc.

Another type of insurance is for liability for employees, which is a statutory requirement. This provides indemnities for injuries and death. He also discussed performance bonds and characterized them as the same as a loan from a bank, which implies the obligation to repay.

Radio manager Louis Haller of KEYY, Pocatello, gave a general talk on the value of advertising as a means of reaching a larger portion of the people in a trade area. He pointed out that businessmen each year do business with about 15% of new customers and that advertising is a means of attracting these customers.

"Why a Standard for Wiring," was answered by Lee A. Steck, manager, Fall River Light & Power Assn. and secretary of the Idaho REA association, Ashton, Idaho. The National Electrical Code, he said, was the basis for all ordinances and state laws but there was too much differentiation in the way it was applied, which caused considerable confusion. The REA's use the N.E. Code as a minimum and as long as wiring is done according to NEC, it would be useful anywhere. His experience had been that the larger the contractor the better the job was apt to be and most trouble came from incompetent wiremen who have neither the business training nor the facilities to do the job right. It was not always possible to inspect rural jobs before they were energized. If done right, no harm was done. If inferior, it was dangerous to do so. He suggested that state inspectors notify the power suppliers where they find installations that should not be energized, and the supplier should disconnect them until they are corrected. Neither should the inspector be expected to be an instructor for an incompetent wireman.

Steck also explained the new rural telephone line policy in which the cooperatives will act as telephone distributors and the REA funds will be used to finance existing agents in the extension of rural telephone lines. It is not intended to finance or initiate any new agencies.

Partners and Associates

"Our Partners—the Electrical Distributors" and "Our Associates—Labor" as well as speakers on other association activities and the inspectors association, made another unique grouping of subjects.

President Woolley explained that as in business partnerships, sometimes a contractor feels he can't get along without his partner, and at other times he feels he can't get along with him. The latter might stem from inner rebellion at knowing that the partner was right. Therefore he asked the partners in the contracting industry to speak freely and to tell them what they should know for their own good.

Dea Board, manager, Afton Lemp Electric Co., Boise, gave a sound pratical talk which will be reproduced in full later. The responsibility for the success of any work always rests on a small group of leaders, he said. He acknowledged the interdependence of wholesalers and contractors by saying that the failure of a wholesale business is as much in contractor's hands as it is in the hands of wholesalers themselves. With 400 licensed contractors in Idaho to 600,000 people, a ratio of one to 1,500 people, the field is holding the same ratio that has probably existed for the past 30 years. Nor have the problems and difficulties changed much in the same time. He then asked how else a contractor could accomplish or make any impression on a list of problems except through his state and national organization.

E. E. Brazier, manager, General Electric Supply Corp., Salt Lake City, followed on a theme, "There Can Be Romance in the Electrical Contracting Business" by recalling the experiences of his own 40 years in the industry. He then showed that there were many features in the materials contractors install that have a romance either as to their development or as to their end result, which is satisfaction for the consumer. A contractor can install either good, fair or poor materials and usually prefers to install the good ones. He can do more if he emphasizes the values and features. He then enumerated a number of benefits from Adequate Wiring that could be emphasized, the necessity for heavier and more circuits to provide for automatic washers, clothes dryers, double oven ranges, etc. He sketched the opportunities in the farm market, the lighting market and emphasized most of all the development of goodwill of customers, employees, communities and neighbors. As for problems, he urged their discussion in a free way either with competitors or with suppliers. He explained some of the real difficulties wholesalers have in controlling policies such as direct sale to industries and selling at retail. He said distributors are making a sincere effort to live up to their policies in these respects.

John Longden, manager, Westinghouse Electric Supply Corp., Salt Lake

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City, gave an inspirational talk emphasizing some of the moral values which need to be rebuilt. He urged contractors to be builders rather than just contractors and to seek to build their industry and their business by building the prestige of the electrical industry.

Sid Cooper, manager, Graybar Electric Co., Salt Lake City, unable to attend, sent a letter in which he predicted 1950 would be the largest year electrically in the entire history of the industry, for the industry was expanding faster than the nation as a whole.

Wallace C. Wright, vice-president, District 8, International Brotherhood of Electrical Workers, gave a constructive and forthright talk on the place of the electrical worker and the union. He described the history of the organization and detailed its democratic constitution and by-laws, with rights of appeal, etc., and stated definitely that the IBEW has no place in it for a Communist element or fellow travelers. He told of the original insurance plan and also the original pension plan. The reason the officers of the union had gone to the National Electrical Contractors Assn. for assistance in bolstering the plan was to pay pensions for a large number of electricians who are reaching retirement age after having served their lifetimes in the employ of contractors. He spoke of the intentions of the union to adhere staunchly to all of its written agreements and described the arbitration clause which permits any dispute which cannot be resolved locally to go to a national council of arbitrators for the electrical contracting industry. The no-strike clause, he said, had prevented any major strike and had enabled the officers to handle wildcat strikes. The construction industry, he said, through the Associated General Contractors, had petitioned the NLRB to waive the union shop provisions of the Taft-Hartley act as applying to the construction industry, due to the extreme difficulty in calling elections in a business where so many of the workers are transients.

The IBEW, he said, is participating in a national jurisdictional board which is trying to settle such jurisdiction claims as between the iron workers and the electricians over erecting of transmission towers and of the iron workers and sheet metal workers and electricians over installation of complete louvered ceilings.

He advocated local union and labor management committees to meet every 30 days and adjust all minor matters so that when negotiations on the contract take place, they will not be cluttered up with grievances which should have been settled during the year. The union, he said, had been successful in assisting contractors to build utility lines and lines for REA's and he discussed the threat of non-union construction of transmission lines since the competition for this work has become especially great.

The supply of electricians for contractors in the future comes under apprenticeship training, Warren I. Cassidy, U. S. Department of Labor, Boise, said, following with a talk on this subject. His theme was "Industry's Responsibilities in Apprenticeship." He maintained that job and on-the-job training in conjunction with school training was the best way to impart the experience of the industry to the young men learning the trade. Since the human factor in production is of more importance these days than machinery even, the skill and knowledge of the human factor is a great problem. Apprenticeship training is the most efficient way to train in these skills. Management must work with the labor organization, since the apprenticeship program needs the guidance of both through joint committees. A paper program is not worth much more than the paper it is written on. It means a day-to-day and year-to-year interest and participation in apprenticeship training to achieve results.

What other associations do was covered by two speakers. T. Ralph Neilson, manager, Electrical Contractors Society of Washington, Seattle, described the reasons for the formation of an independent contractors association in Washington State, its growth from 30 members at the first meeting to a high of 300 at one time and its present status of around 125. "But where you have ills you have to work on them for a long time," said Neilson, and "A manager cannot wave a magic wand and get all that the members ask for. It is not a one-man job, even on full-time." He then discussed some of the things the association had worked for, such as improvement on state legislation in Washington together with the Electric Club of Washington and the NECA. To supply a demand for services to members the society had affiliated with the Midwest Electrical Council which was able to furnish the estimating service, literature and accounting information. The society liked the type of organization and the economy which it offered its affiliates. On their own the society had set up a credit and collection service, a tool pool, advocacy of community newspaper advertising and had improved relationships with manufacturers and suppliers by get-together sessions. He also spoke of labor relations and the responsibility of the union to assist in selling the services of contractors so that they can pay the higher wages negotiated for.

"Some Do—Some Don't" applied to what some associations do and some do not, according to W. A. Cyr, associate editor, ELECTRICAL WEST. He reviewed legal decisions that had recently been enumerated by an attorney at a meeting of league managers. A characteristic of all of the activities which the legal counsel had warned against was that they were all restrictive measures intended to prohibit competitors from doing things. Restrictions or prohibitions seem to be abhorrent to the American nature and are always looked upon with suspicion by the public, whose representative is the government.

Cyr then said that he knew of no association which had ever been in trouble over strictly promotional activities and urged more effort along those lines. The greatest reason for doing so lies in the fact, he said, that nothing else will justify the increasing prices of labor, materials, overhead and profit which a contractor must charge, in the eyes of the public.

Whither Bound?

President Woolley throughout the convention had given bits of his presidential report as introductory material to the speakers. The association, he said, had not been growing and he felt that it would require the full time of an energetic individual as manager to bring more results. The contracting industry, however, is growing fast and is a far cry from that of 20 years ago. Some electrical contractors do business measured in millions and many do it in hundreds of thousands. As a big business, it requires business treatment.

New blood is coming into the business and is not content to do things the way they were done 20 years ago. The business is becoming highly specialized and must be treated with the respect it deserves. He paid a tribute to labor in its relations in this industry and the degree of responsibility it had accepted. He also complimented the machinery set up for adjustment of disputes as a court of last resort.

The final session was directed at the future of the organization, upon which opinions are divided. President Woolley discussed the present three classifications of dues and said that a much more substantial basis would have to be found, probably based on the volume of work, in order to support a paid manager and to do the things the association should do. He repeated the five bad practices (see ELECTRICAL

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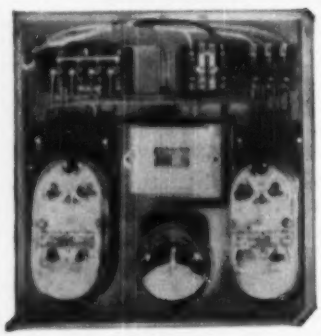

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BEATRICE, NEBRASKA

WEST, Nov. 1949, page 79) needing correction in the contracting industry and felt that through a well-financed organization, some of these things could be accomplished. For instance, the Adequate Wiring machinery is all set up ready to be taken over and utilized if there is an organization to implement it.

Secretary Baldridge suggested holding meetings with suppliers in Salt Lake, Boise and Spokane to ask their cooperation and then he asked those who call on contractors to ascertain, if they could, the reasons why more contractors do not attend such meetings as this one.

William Hopper, Gem State Electric Co., Boise, and past president, presided at the Saturday afternoon session. After calling on Les Johnson, General Electric Co., for a summary of the convention, he had Harold Rising, an inspector for the State of Idaho, discuss the Idaho chapter of IAEI and why contractors should support it. Rising discussed the great conflict in codes and interpretations to be found in the various cities and felt that the inspectors association was a means of bringing together inspectors, contractors and electricians to study the code and to get uniform interpretation. A new plan is being tried in the creation of local divisions by counties so that the attendance to meetings can come from a shorter distance. Each of these divisions have their own atonomy and officers of their choice. The state inspectors merely act as coordinators for uniform interpretation. This, he said, would serve as a school for journeymen and contractors who could not be persuaded to go back to take apprenticeship training.

Hopper asked two people for opinions as to steps to be taken for furtherance of the association. Henry H. Falkner, Westinghouse Electric Supply Corp. manager, Boise, said that education was the keynote and the association might best find its answer through an educational program. He described the farm home meetings which his company had conducted successfully as an example of an educational type of meeting.

Kenneth O'Leary, attorney for the association, Boise, explained that contractors do not consult their lawyers often enough; if they did they wouldn't have to pay so much to get out of trouble. He went into some discussion of the preparation of the revision of the Idaho state law. He emphasized that a law must not be something passed to make business for anyone, but must be entirely promoted as a safety measure. To obtain that safety it requires licensing and supervision and inspection to see that the consuming public gets it. Considerable discussion followed on the details of the proposed new bill which will be presented at an interim session of the Idaho legislature early in the year. A much improved public attitude, it was brought out, has resulted from the work of the inspectors along educational lines. Question was raised whether a city can enact more requirements in addition to the state law and set up licensing within that city as well. The opinion given was that it could.

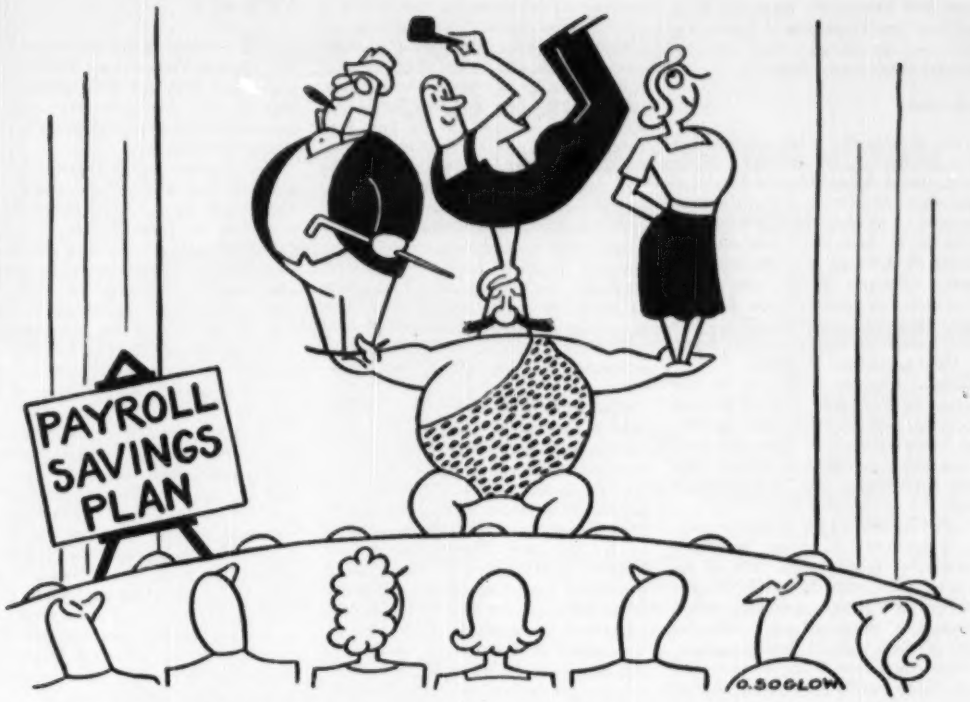
The committee selected to nominate the officers came in with a recommendation that the 1949 officers be retained through 1950. President Woolley accepted hesitantly, saying that he felt that they should increase the number of active interested officers and develop new leaders. The officers were unanimously re-elected. The location of next year's meeting will probably be somewhere more centrally located in the state. Officers elected were: A. R. Woolley, president, Pocatello; Joe Brunzell, vice-president, Moscow; E. W. Hall, treasurer, Pocatello; J. Carl Baldridge, secretary, Boise; E. T. Jones, vice-president, Northern division, Grangeville; Joe J. Gilgan, vice-president, Southwestern division, Caldwell; M. E. Shotwell, vice-president, Central division, Twin Falls; R. W. Bauchman, vice-president, Southeastern division, Idaho Falls. Directors are: Spencer Lewis, Moscow; Claude W. Hall, Glenns Ferry; A. O. Barker, Oakley; R. J. Langford, Montpelier.

Convention arrangements were ably handled by a committee headed by E. W. Hall as general chairman: A. R. Woolley, *program;* Claude Hall and Elsa M. Thompson, *reservations and registration; entertainment,* S. C. Rhoads, Kenneth DeLate and R. D. King; *ladies committee,* Mesdames C. L. Lewis, E. W. Hall and A. R. Woolley. For the banquet, novel entertainment was presented by Steve Rhoads and Ken DeLate, who re-enacted some of the oldtime "Joe Guimoe" stunts. This time Joe was a chiseling contractor whose success was a lesson for all. Billie Dunn and D. S. Bailey, both former Idaho Power salesmen, also participated.

Pot and Kettle Clubs

Los Angeles Pot & Kettle Club held its Christmas party on Dec. 20 at the Elks Club.

Fred C. Wood, president of the Associated Pot & Kettle Clubs of America, will officiate at the club's annual winter market luncheon on Jan. 21 at the Lakeshore Club in Chicago. All national officers will attend, including vice-president W. Clark Wright, Portland; secretary Walter A.



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Stone, San Francisco; treasurer D. J. Bartelme, San Francisco. A ballot was taken recently on affiliation with the National Housewares Assn.

Inspectors

Two Westerners were advanced a notch in the official executive of the International Association of Electrical Inspectors. Arthur C. Veit, electrical inspector, Los Angeles County, was advanced to first vice-president, and Chester M. Kirsop, chief electrical inspector, Olympia, Wash., was moved to second vice-president, as John E. Wise, electrical engineer, Wisconsin State Industrial Commission, became the 1950 president of IAEI.

Oregon Chapter, IAEI, at its last meeting in Portland, decided to hold future meetings in other cities in Oregon, voted to meet at Newport next. A question and answer session featured the meeting. O. T. Fugitt presided.

Utah Chapter, IAEI, at recent meeting, abandoned a group insurance plan among members for lack of applicants. Chairman John Christensen inaugurated a program feature called, "Inspector's Report," to acquaint members with rulings, interpretations, unusual conditions found in the field. At the last meeting D. J. Wolters, Salt Lake City chief inspector, reported use of heating cable on roofs for snow removal and urged that cable of standard manufacturers be used only.

Central California Chapter, IAEI, meeting in Fresno last month heard talks on twist lock devices from Doug Higgins of Harvey Hubbell Inc.; county inspection from R. E. Colby, Fresno inspector, and a talk from Jack Doorschodt, Thomas & Betts Co. The code panel was the real feature of the meeting.

Southern California Chapter, IAEI, at Culver City argued how many outlets should be permitted on multi-outlet assemblies per circuit, came to no conclusion, so set up a committee to study and report at next meeting, Ventura, Jan. 25. The same committee is to study difference in local ordinances and make recommendations for uniformity. Bus-type panels to which circuit breakers are clipped drew discussion. It was felt such should not be accepted as service entrance equipment. Ben Wheater, Long Beach, was elected chairman succeeding George Tansey, Los Angeles. Ed. Muller was re-elected secretary.

Northern California Chapter, IAEI, in a preconvention meeting, had a very thorough review of the hospital surgery electrical hazard problem and discussed proposed surgery safety standards of the state fire marshal's office with officials from that office, the supervisor of hospitals for the state and others. Recommendations were that the state safety orders be made to include such rules, as well as provision of auxiliary stand-by power generating sets to insure lighting and ventilation despite power outages. At its San Jose meeting last month, William Ogden, fire chief, spoke of the joint task of fire prevention by public education, experience and enforcement. The pressure from the Pacific Building Officials Conference to embrace electrical inspection in their fold was a worry. Its cause—too much lack of uniformity in electrical ordinances. A committee was selected by Chairman Keller to study the problem. Next meeting is scheduled for Jan. 21 at San Francisco.

Electrical Inspectors Assn. of B.C. held a convention in Vancouver last month, attended by more than 100, the first inspectors convention ever held in Canada, it was said. L. H. Miller, B.C. provincial inspector, is its president, R. Hall its secretary. Speakers included L. N. Roberson, Seattle, on radiant heating installation; H. N. Walters, president Electrical Service League; J. A. Tames, Canadian Westinghouse, on circuit breakers; D. J. Sanderson, Vancouver chief inspector, on hazardous locations; H. W. Smith, B.C. Electric, on grounding; J. B. Hedley, B.C. Power Commission, described the construction program of the bureau; S. H. Lilley, Neon Products of Canada, a tour of the plant; A. F. Telfer, Canadian Standards Assn., how the association operates and how standards are developed. A visit to the B.C. Electric Ruskin plant ended the conference.

Leagues

Members of the Sacramento Electric League heard electric space heating discussed by Stuart Forsyth at its Nov. 25 noon meeting. Christmas party was held at the Elks Club on Dec. 17.

Rocky Mountain Electrical League is holding its spring conference in Denver, March 26-28. Discussions will cover engineering, accounting, sales promotion and adequate wiring.

Electric League of Los Angeles Inc. is the new and shortened name of Southern California Radio & Electrical Appliance Assn. Changed to broaden the scope of the group's activities, the new name became effective the first of the year.

IES

Special luncheon meeting of the Northern California Section of IES was called on Dec. 1 to hear D. C. Miller, illuminating engineer, discuss new trends in aviation lighting. Miller is in charge of the application of lighting to aircraft and airports at Nela Park.

NWEL&PA

Two Sections of the Northwest Electric Light & Power Assn. have chosen places and dates for their spring meetings of 1950. Decisions were made at executive or planning meetings held in Portland recently.

The Engineering & Operation Section will meet at the Vancouver Hotel, Vancouver, B. C., April 26-28, 1950, according to John Bankus, Portland General Electric Co., section chairman. Committee chairmen were appointed and tentative subjects for study by each were outlined. More time for general discussions of the subjects presented is to be secured by holding two or more of the committee sessions concurrently on one of the days of the meeting.

Committees and their chairmen, who will present programs at the meeting, are: power production, J. D. Ellis, Pacific Power & Light Co.; utilization, R. C. Setterstrom, Montana Power Co.; transmission and distribution, A. I. Sawyer, Idaho Power Co.; code committee, C. S. Alger, Puget Sound Power & Light Co.; electrical equipment, C. E. Cannon, Washington Water Power Co.; meters and services subcommittee, Ellis Van Atta, Pacific Power & Light Co.; electronic equipment subcommittee, L. G. Walker, Idaho Power Co.

The Business Development Section planning group met with Earl A. Olson, Idaho Power Co., section chairman, and selected Butte, Mont., as the place for its 1950 conference, May 15, 16 and 17, at the Finlen Hotel. The pattern of the meeting will be the same as in recent years with some general sessions and some concurrent bureau and committee meetings, but with more time for general sessions and less time for the concurrent meetings.

The effect of this is to give the bureaus more prominence in the general sessions, and each chairman was asked to provide one or more speakers of national prominence on subjects pertaining to his assignment.

Bureau chairmen were appointed as follows: commercial and industrial, Carl Hoffman, Washington Water Power Co.; electric home, Frank Tool, Washington Water Power Co.; adequate wiring, Guy Davis, Pacific Power & Light Co.; rural and farm, C. A. Root, Pacific Power & Light Co.; manufacturer-jobber-dealer-contractor, C. A. Morrison, Canadian General Electric Co.

The following independent committees will meet with the Business Development Section: advertising and publicity, Roy Vernstrom, Pacific Power & Light Co.; rate research, George H. Pike, Washington Water Power Co.

Your own records will show what we've done about lightning

In the middle of 1943 our engineers made discoveries about impulse strength which led to changes in design of small, low- and medium-voltage distribution transformers. What these changes accomplished can be seen in *your* records.

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THE MONTH IN BRIEF

Interior Asks Rehearing on Kings River

In face of an FPC decision that may have far-reaching implications, Department of Interior has asked for a rehearing on orders authorizing power development of the Kings River in California by Pacific Gas and Electric Co. and the Fresno Irrigation District (EWEST, December, p. 114). The decision, first one participated in by Commissioner Mon C. Wallgren, reversed the findings of an FPC examiner who had held, as Interior argues, that public interests would best be served by federal development of the river. The petition for intervention by Interior Secretary Chapman and a motion to permit filing of the petition cite previous participation by the department through USBR and contend that the Kings River is a part of California's Central Valley project. In its decision, FPC held that, while the river is in the general area of the Central Valley, its power development comes under the Federal Power Act.

British Firms Competing for Contracts

British electrical manufacturers are competing for heavy electrical equipment in the Pacific Coast market. Devalued currency gives them a price edge. Two British firms, Ferranti Ltd. and English Electric Co. Ltd. underbid U. S. firms last month on two transformer banks and a bank of rectifiers for Seattle City Light. General Electric, Westinghouse, Allis-Chalmers, Pennsylvania Transformer and Gough Industries were the American firms bidding. On nine water-cooled transformers Ferranti was $98,440 below Pennsylvania's bid of $792,000. On six forced coil-cooled transformers Ferranti's bid was $206,000 lower than Pennsylvania's figure of $720,000. Two angles may affect the final placing of the orders with the British—purchasing policy and ability to meet specifications. Both were undetermined as this issue went to press.

PUD Accepts Space-Heating Curtailment

Use of electricity for new space-heating installations has been banned by the Snohomish County PUD at Everett, Wash. Recent order of the State Public Service Commission to this effect affected only private power companies, but the PUD said it would accept the curtailment as part of the regional conservation program.

Seattle Offered Power Guarantee

Puget Sound Power & Light Co. has offered to supply 83,000 kw. to Seattle City Light until March 14, 1952 (date its franchise expires). Rate would be $17.50 a kilowatt-year, same as the city pays for Bonneville power. The guarantee equals capacity of the company's White River and Snoqualmie hydro plants, which the city earlier tried to buy, and may overcome city objection to buying Puget Power's Seattle distribution facilities without generating capacity to service them. The enlarged Skagit development probably would be able to take care of the load by 1952 or 1953. If the company sells its properties during the life of the contract, the purchaser will be bound to continue the power guarantee, it is provided.

Power Law Opponents Lose Round

Challengers of the new Washington state power bill were told last month that they could not go into the legislative record of the act in their fight against its constitutionality. Olympia business firms and individuals opposing the law, had attempted to show that the act had been hastily jammed through the legislature as a compromise measure (EWEST, April 1949, p. 118). Judge John M. Wilson held the bill as enrolled and passed by the legislature is law and arguments as to its creation are not in order. The law allows PUDs to join in acquiring properties of a private power company, and is pertinent to the present proposal to buy the Puget Sound Power & Light Co. system.

Judge Refuses to Set Aside Ruling

Retired Federal Judge Charles C. Cavanah last month refused to dismiss and set aside his ruling that the U. S. government could not enjoin the Idaho Power Co. from crossing public lands with its Boise-American Falls transmission line (EWEST, November, p. 104). U. S. Attorney John A. Carver had aked that the order in favor of the power company be set aside on grounds that the issues raised had become moot. Judge Cavanah said: "The rule as to dismissal of an action on the ground that the cause becomes moot applies to the appellate court of appeal, not to the trial court. To now vacate the final decree of this court would merely enable the plaintiff to institute another suit upon identical grounds upon which the action was instituted, tried on its merits and final judgment entered." The government has appealed from the judge's decision on erasure of the case from the records and will take its case to the U. S. Circuit Court of Appeals.

Merwin Unit Dedicated

Power generating resources of the Pacific Northwest were increased by 50,000 kw. on Dec. 15, with dedication of a second unit at the Merwin plant of Pacific Power & Light Co. The plant is located on the Lewis River in southwestern Washington, 35 miles from Portland. Paul B. McKee, president of PP&L, officiated, with the honor of placing the unit on the line going to L. T. Merwin, formerly president of the Northwestern Electric Co. (now merged with Pacific) who flew up from Santa Barbara for the occasion. The 50,000-kw. unit is the second of four to be installed at Merwin and is the largest generator to be tied into the Northwest Power Pool in Oregon and Washington in the past 15 years. It accounts for one-fourth of the 200,000 kw. added to the pool by non-federal systems in 1949. The new unit, together with the new Albina substation in Portland and increased 110-kv. transmission facilities, represents an investment of $3.8 million.

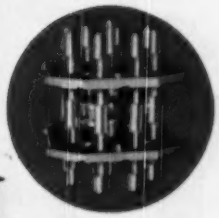
CVA Hearings Delayed

Senate Public Works Committee's on-the-spot hearings in the Northwest on CVA, originally scheduled for last fall, probably won't start until spring. The committee was not to get together until after Congress convened Jan. 3, and congressional business plus mid-winter weather will argue for delay until spring.

Wagner Power Transformers

BUILT FOR LONG LIFE SERVICE

Wagner Power Transformer Elements are particularly outstanding because of their inherent strength and stability and because of their compact design and careful construction. They have sufficient capacity to not only carry their normal load but to be able to handle an overload when the emergency arises. That's why Wagner Transformers have established records for continuous service and long life in all types of industrial plants and transmission lines.



Snap acting rotary type tap changers, designed to permit changing the voltage ratio quickly and effectively, are located near the taps and are connected for gang operation from a single operating handle outside the tank.

Any transformer you buy comes to you with a number of specified, generally standardized, accessories. Your primary requirement in a transformer, however, is the safe transformation of electrical power upon which you can rely. Whether this need is satisfied depends entirely upon the materials used and upon the design and construction of the transformer element inside the tank.

Wagner Power Transformers will meet your primary requirements because they are liberally designed and built using carefully controlled construction methods, highest quality material, and are rigidly inspected and tested.

Field performance is the real proof—Our service records date back to the early 1900's and prove that Wagner Power Transformers give many years of dependable, economical service.

Users of power transformers will find it to their interest to consult Wagner on their next transformer installation. Twenty-nine branch offices, located in principal cities and manned by trained field engineers, are ready to serve you. Bulletins TU-180 and TU-181 give information on the complete line of Wagner Transformers.

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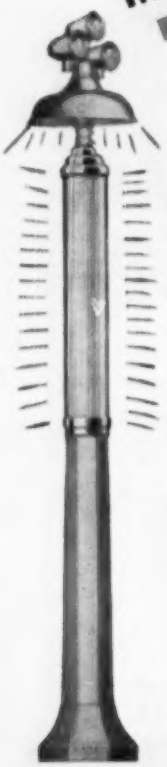

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THIS MONTH'S NEWS

Federal Government Objects In Rate Increase Hearing

As hearings on Pacific Gas and Electric's application for a 6% rate increase opened last month before the California PUC, federal representatives indicated they would object on grounds the boost would cost government agencies $180,000 a year.

PG and E spokesmen, however, pointed out that, if the increase is allowed, $3,673,000 of the $8,820,000 gross revenue expected from the increase will go to the federal government in 1950, at present tax rates.

They also brought out that, where power purchased from CVP in 1948 cost 3.12 mills, it now is costing 5.15 mills on the day-to-day delivery agreement with USBR. Estimating CVP power purchases for 1950 at two billion kilowatt-hours, the company expects to pay the federal government about $10,290,000 as against $5,195,000 in 1948.

The company is asking for an interim order for the 6% increase. Company officials point out that it will be the first rate increase in 29 years, and it is needed to meet increased operating costs and to continue the current construction program. If the increase is approved, it will give the company an earning rate of 4.68%.

Power Situation Improves, Though Still Critical

Although considerably brighter than a year ago, the power situation in the Pacific Northwest is still delicate, members of the Northwest Utilities Conference Committee agreed at a meeting in Tacoma, Wash., last month.

The margin between supply and demand is narrow and will continue so throughout the winter, committee members declared. Prolonged cold weather could produce a power shortage worse than last year.

● BONNEVILLE'S new 10,000-kva. Camas substation started serving the Camas-Washougal area of the Clark County PUD Dec. 15, according to Charles Dunn, acting manager, Lower Columbia district office, Vancouver, Wash. Power will be fed into the new substation over a two mile tap line connecting with the Bonneville-Vaucouver 115-kv. line.

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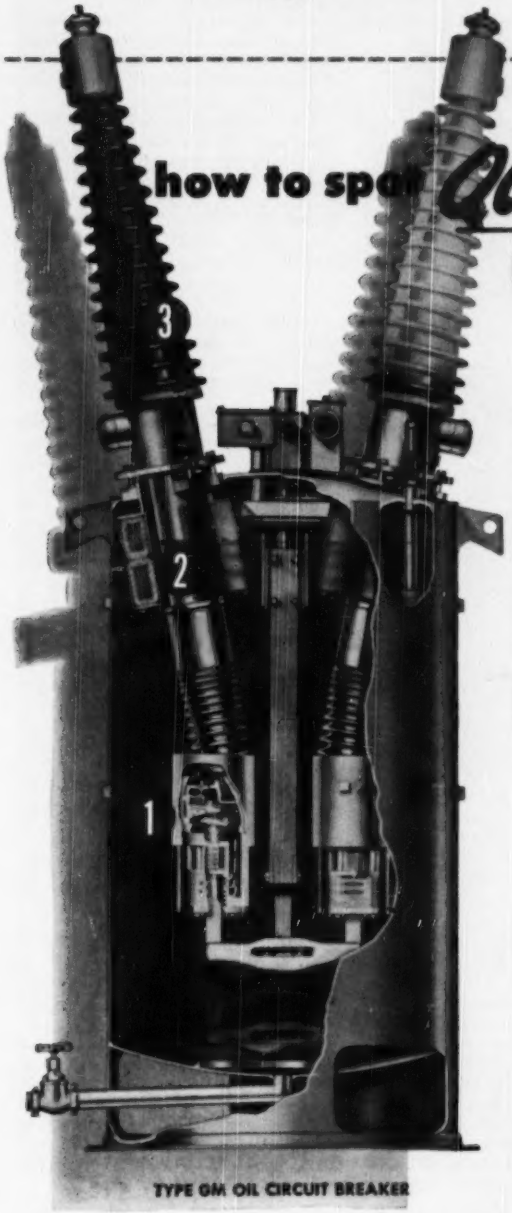

TYPE GM OIL CIRCUIT BREAKER

how to spot QUALITY in a
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OFFICIALS AGREE TO OPPOSE SPREAD OF SOCIALISM

Complete political accord against the spread of "creeping socialism" and collectivistic tendencies in this country was expressed at a two-day assembly of spokesmen for five Arizona utilities and their union employees at Phoenix, Ariz.

Capital and labor cannot live without each other—neither can America meet the challenge of encroaching collectivism unless there is an all-out cooperation between the two groups, representatives were told by Governor Dan E. Garvey.

His theme was echoed by utility and labor spokesmen.

Dr. A. S. Bennion, vice-president of the Utah Power & Light Co., one of the keynote speakers, said: "We've got to combine all our efforts toward the job of combating the inroads of creeping socialism into our national life."

J. Scott Milne, international secretary for the International Brotherhood of Electrical Workers, said, so far as the IBEW was concerned, the federal government has gone into the utilities business far enough. The union will resist, he said, any efforts to put the government deeper into the utilities business.

The session was lauded by both management and labor. W. L. Ingram of Fort Worth, Texas, vice-president in charge of the International's District 7, expressed hope the idea would spread to other states, eventually culminating in a nation-wide meeting working in complete harmony for the common good and for a common cause.

Sponsoring the Arizona clinic were the IBEW and Central Arizona Light & Power Co., Northern Arizona Light & Power, Arizona Edison, Tucson Gas, Electric Light & Power, and Salt River Valley Water Users Assn.

Portland Commission Starts Campaign for New Industry

Ivan Block, power consultant formerly with the Bonneville Power Administration, has been engaged by the Port of Portland Commission, Portland, Ore., to assist in a campaign to locate new industries in the area. The Bonneville administration is collaborating in the campaign.

Abundance of hydroelectric power to be available within three to five years, with completion of McNary Dam and other dams on the Columbia River and its tributaries, prompted launching of the campaign. It will be directed chiefly to industries requiring large amounts of cheap power, such as electrochemical installations.

Return of the Swan Island area by the War Assets Administration to the Port of Portland provides sites which will be offered for industrial development. Swan Island was the site of a Kaiser shipyard during the war.

New Bonneville Line Bringing Power Into Portland

Bringing more Grand Coulee power into Portland and the Willamette Valley, Bonneville's 230-kv. line from North Bonneville to Troutdale, Ore., was energized last month. The $1,110,000 line was built by Midland Constructors of Los Angeles.

Transmission facilities of the 22-mile high voltage circuit enable Bonneville lines to carry peak loads of 750,000 to 800,000 kw. to the lower Columbia River area, compared to the previous line capacity of 550,000 to 600,000 kw. over the two 230-kv. circuits. Peak load of more than 300,000 kw. will be fed into the lower Columbia system via the two 230-kv. circuits from Grand Coulee to North Bonneville.

Connecting jumpers in the final link on 100-ft. dead end towers near Washougal, Washington, where the new North Bonneville-Troutdale 230,000-volt line crosses the Columbia River

Future Bonneville plans call for a second 230-kv. North Bonneville-Troutdale line to carry generation from McNary Dam direct to Willamette Valley load centers, requirements of which are expected to exceed 1,300,000 kw. by 1954, when McNary will be in production. The steel towers carrying the new line are of double construction to provide for the second circuit.

BIDS CALLED BY ENGINEERS FOR CHIEF JOSEPH DAM

Bids for design, manufacture and delivery of the first ten 100,000-hp. hydraulic turbines for the Chief Joseph Dam on the Columbia River 50 miles downstream from Grand Coulee Dam have been called by the Corps of Engineers for opening Feb. 10 at Seattle.

The contract includes embedded parts and appurtenances, as well as draft tube pier nosings for ten additional units. The ultimate installation will call for 27 main units, with a capacity of 1,728,000 kw., and two station service units. Almost 2,000 ft. long, the power house will be the longest single-structure power house in the world.

Initial power house construction will provide the substructure for 20 main units and the assembly bay plus the superstructure for ten of these units.

Completion of draft tube liners, anchorages, scroll cases, speed rings, pit liners and other embedded parts is required at two-month intervals, beginning July 1, 1953, and ending with work for the tenth unit Jan. 1, 1954. Delivery of remaining parts to complete the turbines is required at four-month intervals, beginning July 1, 1954, and ending with completion of the tenth unit by May 1, 1957.

The dam will be part of the second largest hydroelectric power producing plant in the world, being exceeded only by Grand Coulee. Bids on the first construction work, excavation of about 4,500,000 cu. yd. for the intake canal, will be opened Jan. 17.

When completed, the dam will be 220 ft. high and 1,484 ft. long, creating a reservoir extending 51 miles upstream to Grand Coulee Dam. The intake canal to the power house will be 27 ft. deep, 3,000 ft. long and about 170 ft. above the present river bed.

New Feather River Plants Go Into Service

First of two 37,500-kw. generating units of Cresta power house, one of Pacific Gas and Electric Co.'s two new hydro plants on the Feather River in northern California, went into service at the end of November. The second unit will be completed in the near future.

Rock Creek power house, upstream from Cresta, is scheduled to go on the line in March. The two hydro projects, including two diversion dams and a total of 10½ miles of 25- to 27-ft. diameter tunnels, will cost about $62,000,000.

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No. 202A. Medium Base. Has shadeholder ledge. Made of Bakelite and designed especially for outdoor use. Has molded Bakelite insert to prevent shorts from water leaks. Center contact is of phosphor bronze. Comes with wire leads.

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PIN TYPE WEATHER PROOF SOCKET

No. 206 Has unique attach-on feature. Quickly wired and installed, as it requires no soldering. Has suspension hook. Rugged construction makes it ideal for all outdoor decorative lighting.

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FPC LICENSE ASKED FOR BOULDER CREEK PROJECT

License for construction and operation of a hydroelectric project on South Boulder Creek in Boulder County, Colo., has been requested from FPC by the City and County of Denver for use of its Board of Water Commissioners.

The project would include a dam and reservoir with an initial capacity of 42,000 acre-ft. and an ultimate capacity of 113,000 acre-ft.; a closed conduit 18,500 ft. long; a power house with an installed capacity of 10,500 hp. and a generating capacity of 7,875 kw., and a 2¾-mile transmission line leading from the power house to a transmission line of the Public Service Co. of Colorado, which carries electric energy to Denver.

The application says the project is primarily designed to supply water to Denver and the generation of electric energy is purely incidental and for the purpose of helping defray the cost. Although the immediate use for the power to be generated at the project is to supply Public Service Co., the application says that the Board of Water Commissioners hopes ultimately to develop sufficient electric generating resources and transmission facilities to supply itself with all electricity needed for water works purposes.

Bridge River Third Unit Put On Line in B. C.

Third 62,000-hp. unit at the Bridge River plant of B. C. Electric Railway Co. has gone on the line, bringing total capacity of the plant to 186,000 hp. This installation makes the company the largest producer of power in western Canada.

A. E. Grauer, president, said "more than $30,000,000 has now been spent on Bridge River and other facilities required to receive and distribute its energy." Construction includes two dams, three six-foot penstocks 2,200 ft. long, steel and concrete power house, three generating units, 130-mile transmission line to Vancouver, and Horne-Payne substation in Vancouver.

● A NEW PEAK HOUR production record — 2,954,000 kw. — was established by Grand Coulee and Bonneville generators on Nov. 21 between 11 a.m. and noon. During the 24-hour period on Nov. 21 energy production at Grand Coulee reached a new high average of 1,511,000 kw., about 16% above rated capacity of the 12 generators.

CLAIM TUNNEL DRIVING RECORD AT BIG CREEK

A world's record is claimed for 24-ft. diameter tunneling at Southern California Edison Co.'s Big Creek No. 4 hydroelectric project near Fresno, Calif. Morrison-Knudsen Co. tunneled 222 ft. through solid granite in a recent six-day period, averaging 37 ft. per day, with peak for one day of 41 ft. Three shifts working a six-day week have already completed approximately half of the 2,415-ft. No. 1 tunnel. A second 24-ft. tunnel is to be started soon.

Conventional methods employed include use of one jumbo and a double-motored Conway mucker. The jumbo has 13 drills set on three levels using 2-in. alloy bits. Twelve 14-ft. rounds were drilled during the record six-day period. Morrison-Knudsen and the Bechtel Corp. are general contractors on the project. Rapid progress on the Big Creek 4 job and the delivery dates on equipment are such that Edison is now planning on having the two-unit, 84,000-kw. power plant in service in August 1951. This is several months earlier than originally contemplated.

Power Site Surveys Completed at B. C.

Surveys of possible power sites for the new hydroelectric development of the B. C. Power Commission have been completed, according to S. R. Weston, chairman of the commission, but some time will be required to study the reports and to assemble material for construction.

The sites are being examined by B. C. Power Commission engineers for a proposed $5,000,000 development to supply the Quesnel-Prince George area. The government at the last session of the legislature announced it would provide the commission with $5,000,000 interest free for five years for the development.

The commission is also making surveys at Clowham Falls for a 12,000-hp. development to serve the Sechelt Peninsula.

● S. MORGAN SMITH, York, Pa., submitted to the Corps of Engineers the lowest of three bids for the design and manufacture of four 111,300-hp. hydraulic turbines for the power house at McNary Dam on the Columbia River. The bid was $5,040,110. The company holds the contract for the first four turbines for the McNary plant. The new contract will cover turbines 5, 6, 7 and 8, including embedded parts, and pier nosings for ten units of the power plant. The schedule calls for delivery of the first of the four additional turbines by Oct. 1, 1951; the fourth by May 1, 1953.

● GALLUP ELECTRICAL CO., municipally owned power company at Gallup, N.M., has announced cuts of from 20 to 33% in electric rates effective Jan. 1. Domestic and commercial schedules will be lowered. According to Manager Art Perry, the lower rates are intended to encourage greater consumption of power. Local appliance dealers had urged the reduction in electric rates.

FOR SALE

2—36 KVA, 2400 volt, 150 Amps. 10% raise and lower or 300 Amps. 5% raise and lower, single phase, 60 cycle, oil immersed Westinghouse type SU induction voltage regulators. Serial Nos. 3342178 and 3349505. Used about 1½ years on light intermittent service.

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Inspection of the above equipment may be made in Portland area. This offer of equipment is subject to prior sale.

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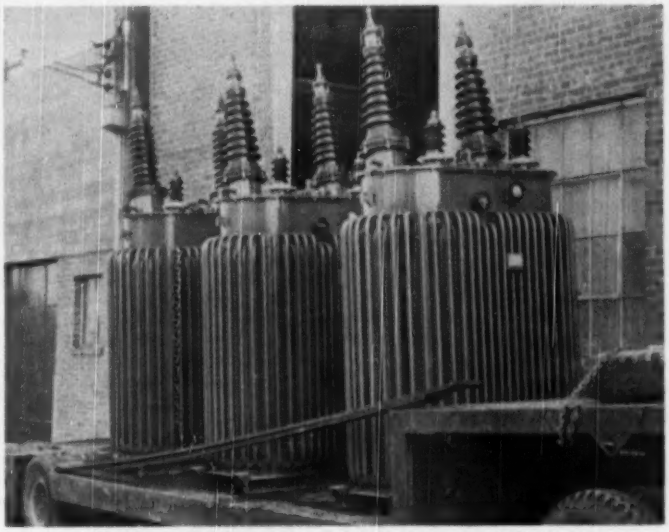

Three 833 KVA Gardner transformers, 69000 volts to 7200/12470 Y volts, single phase, recently shipped to the California-Pacific Utilities Company at Burns, Oregon.

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GARDNER TRANSFORMERS GUARD PROFITS

BIG ATTENDANCE AT OPEN HOUSE FOR STEAM PLANT

Nearly one fifth of the entire population of Santa Fe, N. Mex.—more than 6,000 persons—attended three-day open house ceremonies at the new steam electric generating plant of the Public Service Co. of New Mexico.

Completion of the $1,000,000 station followed by little more than a year the city's grant of a 25-year franchise to the company in the fall of 1948.

The three-story station, built in Santa Fe style architecture, holds a 7,500-kw General Electric turbine generator and has room for an additional generator. Three marine boilers have been installed, two of which are now in operation.

Chief Engineer Howard A. Person was responsible for the basic designs and specifications of the new station and construction was done by Stearns-Roger Manufacturing Co., Denver.

New Santa Fe power station of the Public Service Co. of New Mexico, above. At right, Howard A. Person, vice-president and chief engineer, responsible for basic designs and specifications of the new station; M. C. Heffelman, vice-president and Santa Fe division manager, who supervised the construction of the power plant

Estimates Asked for BPA Power for State Buildings

Oregon State Treasurer Walter J. Pearson has asked the Bonneville Power Administration for estimates on the cost of obtaining electricity for state buildings direct from the government development. At present the state obtains its electric power from Portland General Electric Co., whose contract has another year to run.

In explaining his proposal, Pearson said he realized that Bonneville is not engaged in retailing power and solicits no direct accounts, but he cited legislative authority for the state to negotiate a contract for direct federal power and to construct necessary lines to carry such power to state buildings.

Pearson contends the state could make a material saving by entering into a direct contract with Bonneville, although he could make no estimate on the cost of necessary installations. A prewar estimate was reported to be $750,000, but it was considered likely present costs would be at least twice that much.

Portland General Electric recently requested that its present contract be canceled and a new four-year contract be negotiated which would save the state $2,300 a year.

Congressional Committee Studies Pollution Effects

Witnesses appearing at Seattle, Wash., before a congressional committee to study effects of pollution on Puget Sound fisheries disagreed on what constitutes the greatest menace to the state's salmon fishing.

Alvin Anderson, state fisheries director, blamed dams and drainage practices, declaring, "We're going to be kilowatt-happy and fish-poor."

Norman Riddell, chief biologist of the department, cited pollution as the major cause of disappearance of the salmon runs in some areas. Among these areas are the Everett Harbor and the Snohomish River flowing into it, where toxic pulp mill wastes have critically damaged the salmon runs; Seattle's Duwamish Waterway and Elliott Bay, Tacoma Harbor and Bellingham harbor.

Tax Dispute Settled by Water Users Association

A tax dispute with the government involving more than $5,000,000 has been settled by the Salt River Valley Water Users Assn. at Phoenix, Ariz., for $100,000. The suit concerned income and excess profits tax liabilities.

Settlement was made with the U. S. Bureau of Internal Revenue. The action dissolved a deficiency suit filed by the government for the years 1936-37, and a case set for trial before the Tax Court of the United States was dismissed.

All years subsequent to 1937 were held in abeyance awaiting outcome of the original case which involved $290,414 plus accrued interest of $207,378.

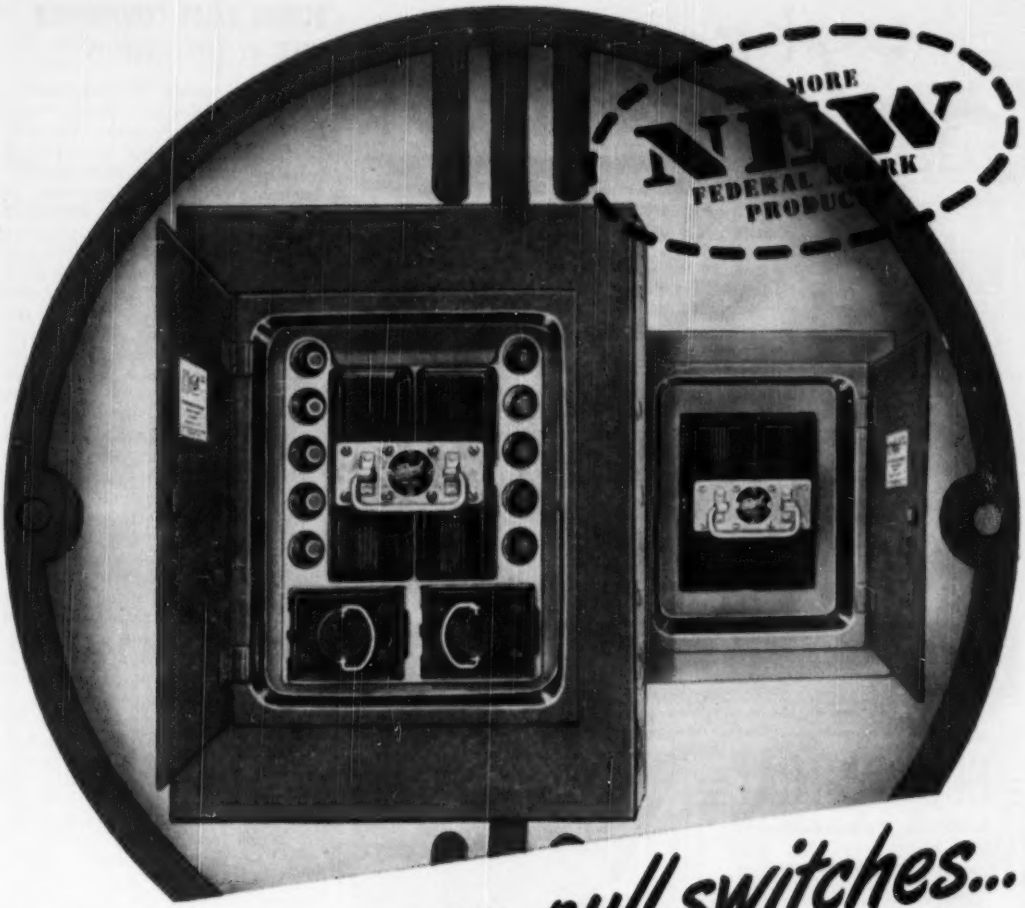
Basis of the settlement was that the Salt River Project Agricultural Improvement and Power District, which owns and operates the Water Users Assn., is a political subdivision of the state, and not subject to tax.

After the original tax deficiency claim, the government held in abeyance further possible claims until disputed claims were settled. Water Users officials admit to a total possible claim of "more than $5,000,000," while other sources report the total topped 6,500,000.

Settlement of the suit establishes the Salt River Project District for continued tax-free operations as a subdivision of the state government, according to Richard D. Searles, association president .

● A NEW 8,000-kw. hydroelectric generator has been put into service at the Walterville plant of the Eugene (Ore.) Water & Electric Board, marking completion of a $1,500,000 rebuilding project. The plant was built in 1911 with two 700-kw. generators and has supplied Eugene with electricity continuously since that year. The original generators will be mounted on display in front of the power plant.

● OPEN HOUSE ceremonies and a general community celebration marked dedication at Miami, Ariz., of a new 1,250-kw. diesel generating unit by Arizona Edison Co. The Nordberg dual fuel combustion engine required 2,500 ft. of floor space at Arizona Edison's plant and brought to $750,000 the utility's expansion costs in the area during the past two years.



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Federal Noark 100 Amp. Pull Switch

THESE ADDITIONS to the Noark line brings you brand new opportunities to capitalize on Federal Noark engineering and construction. Features that help make these new switches outstanding are:

Federal Noark 100 Amp. Main-and-Range Pull Switch...attractive yet low cost. Single enclosure has capacity for: Main; 100 ampere pullout, 125/250 volt A.C., 3 wire, SN.

Branches; (a) two 60 ampere (or one 60 ampere and one 30 ampere) pull-outs, 3 wire, SN, for range and water heater.

(b) Ten plug fuses, 2 wire, SN branches for lighting circuits.

Bus extension lugs permit sub-feeding to other centralized load panels. Split neutral bars, located beside the rows of plug-fuse terminals, save valuable wiring time—simplify wire identification.

Federal Noark 100 Amp. Pull Switch . . . specially designed for compactness to fit small spaces. Sturdy, simple construction. No hinged joints. Completely dead-front . . . even with puller head out, all live parts are shielded.

Order these new switches from your distributor. And write for full descriptive literature. Federal Electric Products Co., 50 Paris St., Newark 5, N. J.

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100 AMP. MAIN-AND-RANGE AND 100 AMP. PULL SWITCHES

Complete line of Federal Electric Products includes Motor Controls, Safety Switches, Service Equipment, Circuit Breakers, Panelboards, Switchboards, Control Centers, Bus Duct * Sales offices in principal cities.

* Smaller Size- BIGGER LOAD!

600 Volt - Heat Resistant Grade PARA THERM Type RH

* The biggest "pay-load" for its size.

Paranite wire or cable is made under the watchful eye of SQC — Statistical Quality Control! Nothing is left to chance. Scores of graphic tests, measurements—figures and figures—by columns and rows of columns—are drilled, marshalled, compiled and analyzed with individual operations still in progress. With SQC on guard you can confidently recommend and use Paranite for lasting satisfaction.

That's Why PARANITE PARA-THERM (Type RH) BUILDING WIRE Saves You Dollars

You get more for less when you choose Paranite Para-Therm (Type RH) wire and cable. This wire carries a bigger pay-load. Saves on initial cost. You also save through being able to use smaller conduits in most instances. And you save in the ease of handling lighter materials.

Paranite Para-Therm (Type RH) building wire has higher heat-resistant qualities: 75° C permissible operating temperature compared with 60° C for Type R. That's why it has greater current carrying capacity. Where voltage drop is not a problem, as in industrial feeder circuits, Paranite Para-Therm does a better job and will last longer because of superior heat-resistant insulation. You also get the plus of S.Q.C. in Para-Therm.

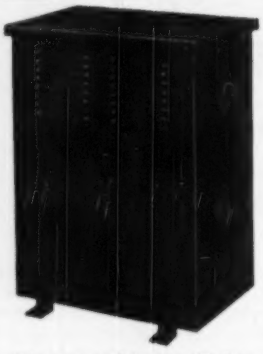
IF IT'S **PARANITE** IT'S RIGHT!

PARANITE WIRE AND CABLE

WAREHOUSES AND SALES OFFICES: *Atlanta, Ga., Boston, Mass., *Chicago, Ill., Cleveland, Ohio, Dallas, Texas, *Detroit, Mich., *Kansas City, Missouri, *Los Angeles, Calif., *Newark, N. J., Philadelphia, Pa., *Portland, Oregon, *St. Louis, Missouri, *San Diego, Calif., *San Francisco, Calif.

ECONOMICAL

Jeffries Transformers



Reasonable in Price
Reliable in Performance

Jeffries large transformers are priced reasonably—and you can save their first cost in a short time by minimizing current losses. When you use a Jeffries transformer, you can provide voltage change at the point desired, without prohibitive expense.

We supply all types and sizes. If not in stock, we build to order in a hurry—a week to 10 days.

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No. R-101

Opens **WIDE—** *for Easy Installation*

This improved Sherman Armor Rod Clamp is speedily installed without removing nut, lockwasher and bolt. Unique interlocking design — clamp automatically adjusts to fit all usual wire sizes. Made of special silicon aluminum alloy having high strength and corrosion resistance. No. R-101 has pure copper liner in small groove. Write for Bulletin 25.

H. B. Sherman Mfg. Co.

Battle Creek, Mich.

Sherman ARMOR ROD CLAMPS

POWER SALES CONFERENCE HELD AT LOS ANGELES

"Buyer's market" is a misnomer—it's really a "salesman's market," General Electric Vice-President Chester H. Lang, told 300 utility executives at G-E's southern California-Arizona Industrial Power Sales Conference in Los Angeles recently. The salesman is the man who must "yank our economic machine off dead center and get it rolling again," he declared. He took issue, also, with another pat economic phrase, "demand is slackening." "Demand is a phony word," he said. "This country was made by salesmen who went out and made people want things." This year's decrease in the growth of electric loads throughout the country was a trend that must be quickly reversed, he said, adding that nothing is more likely to accomplish this than good old-fashioned hard selling. "We must simply, mathematically, increase our sales contacts if we expect to increase our business."

Harold Quinton, executive vice-president of Southern California Edison Co., cited another type of selling vital to the continued growth of the utility industry—that of selling the services and production of our free enterprise system. "Penetration of the forces of Socialism into the power industry has been deeper and wider and more coolly calculated to destroy than in any other," he declared. As a result of the concentrated attacks on the power industry, he said, the problems of giving permanent form to the financing required for the vast expansion of productive facilities in this industry have been all but unsolvable. He urged that his listeners "as salesmen" inform themselves of "what is really happening to this country—and let not one sales day go by without at least one sales effort for our return to a free enterprise economy." Edison has recognized the need for this sales job in an ever-expanding budget for sales promotion expense, Quinton said, which has grown to a "very considerable sum" from "practically zero" during the war.

Establishment of industry programs to increase the prestige of the selling job was urged by Ray W. Turnbull, G-E's Western commercial vice-president, who asserted that the salesman is as much a professional man as any other specialist. General Electric is paying particular attention to the importance of serving the electrical industry with competent men, he said. He reported the company spends about $9,000 in post-graduate education for each of the engineers recruited from the colleges—some 1,400 during 1948.

Other principal speakers at the day-

long meeting were W. W. Pearce and O. K. Buck, both of the Los Angeles Department of Water & Power; James F. Bone, industrial manager of the Los Angeles Chamber of Commerce, and A. D. Bragg, manager of G-E's Pacific district.

BPA Construction Plans Outlined to Contractors

Bonneville Power Administration called together more than 50 contractors from Oregon, Washington, Idaho and California in the Crystal room, Benson Hotel, Portland, early last month to outline its 1950 construction program and discuss contractual relationships. The meeting was sponsored in cooperation with the Associated General Contractors Inc., and the National Electrical Contractors Assn.

Paul J. Raver, administrator, said BPA's construction program for the coming year will call for contract expenditures of $8,754,000, including $3,091,000 for right-of-way clearing, $3,832,000 for high-voltage transmission line construction, $1,564,000 for substation construction, and $267,000 for microwave radio relay and miscellaneous construction. More than 85 separate contracts will be involved.

The meeting held open discussions on specifications, contract procedures, size of contracts and other mutual problems.

NECA officers at the meeting included E. R. Cornish, director, Pacific Coast Office, San Francisco, and John B. Majerus, manager of the Puget Sound chapter, Seattle. AGC was represented by A. H. Harding, Portland manager, and Ray H. Northcutt, Portland president. The International Brotherhood of Electrical Workers was represented by O. G. Harbak, international vice-president, San Francisco, and R. H. Wooden, business manager, Portland.

● THE 22nd annual rural electric conference of the University of California division of agricultural engineering will be held at Davis, Calif., Jan. 30 and 31. Speakers will discuss water and power needs of the state; electric service for rural schools; electrical safety; use of electricity in suburban homes; orchard equipment; curing alfalfa hay; lighting for turkey egg production; mechanization in the poultry business; electric irrigation systems; a variable-speed electric motor.

● MORE THAN DOUBLING plant output, a 7,500-kw. generator was put on the line by the Provo, Utah, municipal power plant, last month. The unit was part of a $1,500,000 plant addition.

IT'S EASY TO INSTALL

GE STANDARD METER SOCKETS

* Roomy wiring space for higher rated conductors
* One-piece snap-action stainless-steel sealing ring—no tools required
* Permanent dimensions with die-cast base

TYPE R1 SINGLE-PHASE METER SOCKET

Not only is the standard G-E meter socket easy to install—it's easy to stock too. One catalog item covers the widest practicable range of meter ratings.

Where the maximum rating of the standard socket is not enough, choose the new G-E high-capacity socket. It can be used with conduit sizes up to 2½ inches, cable sizes up to 4/0.

Detailed data available from your G-E representative. Let him help you. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

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TYPE QPX

Extreme versatility permits use as tap, tee, cross, or end connector. Wide range of conductors accommodated in each clamping groove.

Write for Catalog 52.

GEO E. HONN CO.

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ABSORBS VIBRATION

NEW Neoprene Pad Brush cuts BRUSH REPLACEMENT

FOR MOTORS SUBJECT TO OUTSIDE VIBRATION, here's a new Helwig-Speer development that gives you longer brush life, better motor performance, less commutator grinding. The spring hammer rides on a Neoprene pad that absorbs all vibration, saves spring fatigue, reduces sparking. Write for new Catalog 95. Or call your nearest Helwig office.

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NOTES ON THE TRADE

● General Electric's design and construction division at Hanford Works, Richland, Wash., has been reorganized into three separate line divisions —power and mechanics, headed by J. R. Kelly, division manager; separations, under E. W. Seckendorff, and reactor, headed by P. E. Lowe. C. O. Henning, principal civil engineer; W. J. Dowis, principal electrical engineer, and J. H. Black, principal mechanical engineer, have been appointed consulting engineers to F. R. Creedon, manager of the divisions. The three divisions have a supporting staff organization including an administrative section, an accounting division, a contracts section and a construction services division. R. E. Davison is the newly appointed contract supervisor and J. W. Mercke manages the construction services division.

● Allied Industries, Los Angeles, has become sales representative for Enameled Metals Co., representing Pittsburgh standard conduit, electrical metallic tubing, conduit and EMT fittings. Allied Industries will cover southern California, Arizona and southern Nevada.

● Sangamo Electric Co., Los Angeles, has moved to 1206 S. Maple Ave.

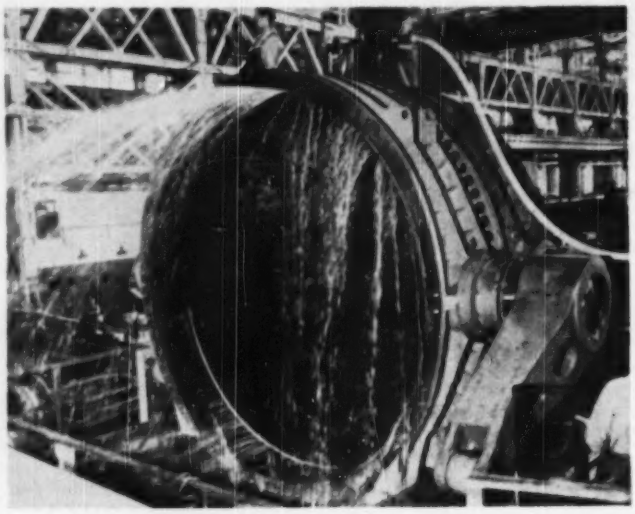
● Rome Cable Corp. has announced the opening of a new warehouse in Salt Lake City. A complete line of insulated wires and cables will be stocked. The Salt Lake City office is located at 230 S. 4th West. H. L. Rawlings is in charge.

● Triangle Conduit & Cable Co. Inc., San Francisco, has moved from 383 Brannan St. to 656 Townsend St.

● General Appliance Co., Spokane, has moved to N. 1721 Monroe St., providing more display and a large parking lot in the rear of the store.

● Spector Co., Western Merchandise Mart, San Francisco, has received factory representation in northern California for Videraft Corp., manufacturers of television sets; and for Ultra-Cold, Los Angeles manufacturer of refrigerators and ranges.

● General Sales Corp., San Francisco, has opened a branch in Portland, under the management of E. E. Wade. His former position as representative for the firm in Oakland has been taken over by B. A. Litchfield. Charles Marshall has been transferred from the San Francisco to the Sacramento territory.



There will be as much as 1,350,000 gal. of water a minute flowing from the dam, when this big 13-ft. butterfly valve and its twin are installed at PG and E's Rock Creek power house. This 50-ton steel unit is one of four built at Sunnyvale plant of Westinghouse, two for Rock Creek and two for Cresta power house. Picture was snapped as valve was opened to release 2,500 gal. of water. To make test, Westinghouse engineers backed up two units and pumped water under pressure into space between the two butterfly valve leaves. Elaborate precautions were necessary before test could be made without danger of flooding nearby plant areas

● Pioneer Appliance Co., located at San Francisco Merchandise Mart, has opened a new warehouse at 502 Minnesota St. in San Francisco. Kenneth Sowles, formerly with Thompson & Holmes Ltd., has been appointed representative for Pioneer in the Sacramento Valley territory.

● N. C. Teakle Co. and W. Barret Co., newly appointed distributors for Packard-Bell in the East Bay area, have established headquarters at 153 E. 14th St., Oakland, where they have offices, warehouse and showrooms.

● Wood & Cies Distributing Co., southern California distributor for Tele-tone Radio Corp., will also distribute the Tele-tone line in the San Francisco Bay region, according to a recent announcement.

● Walter B. Lloyd Co., Salt Lake City, has moved to a new location at 51 S. Second West St. Former location was at 850 S. Main St.

● New California distributor for the Monitor aerator washer is Monitor Engineering & Sales Co., with offices at 1909 South Western Ave., Los Angeles. Monty Beckman is manager of the distributing firm.

● Test Instruments Unlimited, factory representative, has opened two new field offices, one located at 596 35th Ave. S.W. in Seattle, and at 11702 Mansfield Ave. in Spokane. The main office of the company, which handles electrical and electronic equipment, is located at 331 S.E. 62nd Ave., Portland.

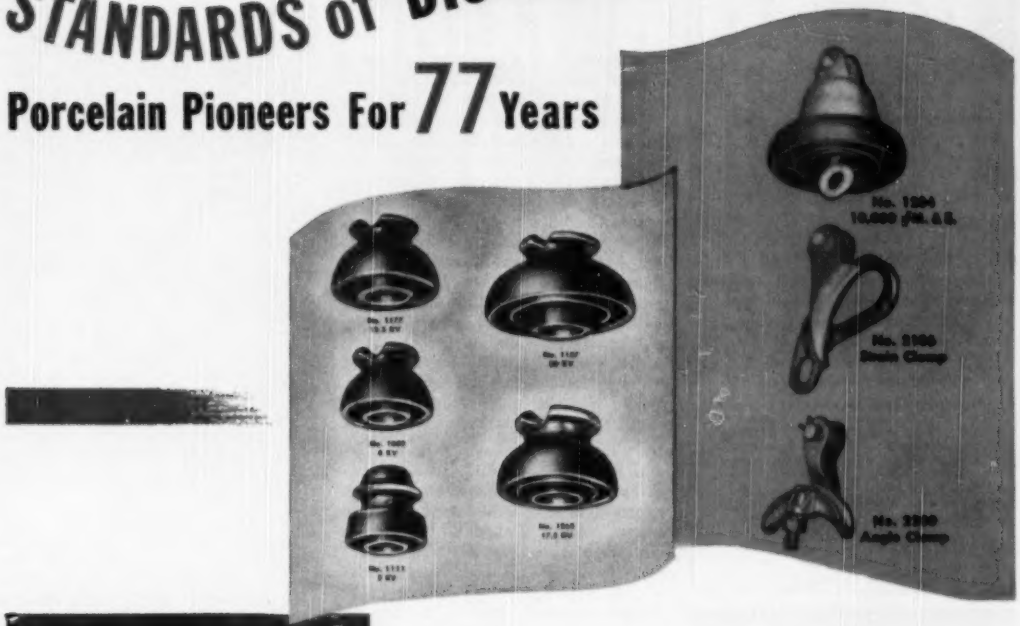
● Paul H. Rice Co., Western Merchandise Mart, San Francisco, is the new manufacturer's representative in northern California for the House of Television Inc. of New York City.

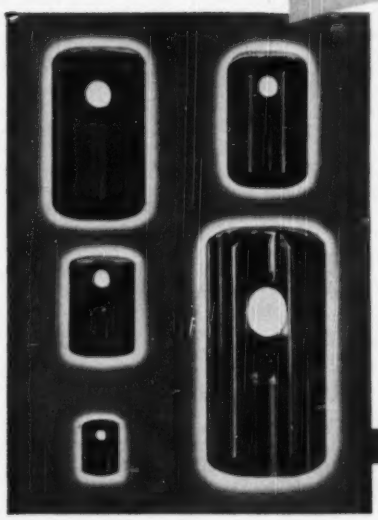
● Western Appliance Distributors, Phoenix, are newly appointed Arizona distributors for Hoffman Radio Corp., Los Angeles.

● Love Electric Co., Seattle Hoffman distributor, recently installed a complete TV installation and service department. Frank Cheaney, formerly with Capehart, is manager.

STANDARDS of DISTRIBUTION QUALITY

Porcelain Pioneers For 77 Years





No matter what your porcelain insulator requirements, THOMAS can satisfy them . . . whether for high-voltage transmission or low-voltage distribution. Specifically, our distribution porcelain and hardware are backed by the same 77 years of ceramic experience and knowledge which distinguish THOMAS high-voltage suspension and pin-type designs. Consequently, THOMAS porcelain is the standard of comparison for discriminating engineers throughout the Electrical Industry. Make it *your* safeguard for reliable electrical distribution. ***Always specify THOMAS—the best by line test.***

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. . . illustrates and describes the complete THOMAS line. Enclosed in a loose-leaf binder, it provides a ready reference for all Transmission-Distribution Insulators and associated Line Hardware. New Insertions, as issued, are sent to all catalog holders.

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ALL the strength and durability inherent in steel are combined—with definite economies—in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.
MUNCIE INDIANA

NEWS ABOUT PEOPLE

● CREATION of a new post — Central Valley project superintendent — and appointment of MARTIN H. BLOTE as acting superintendent were announced recently by Richard L. Boke, USBR regional director. The move was made in preparation for the operational phase of the CVP, Boke said. Blote joined the bureau staff in 1944 when the regional organization was set up and has headed the irrigation operations division since then. For 24 years previous he was on the staff of the California state engineer, participating in the original studies for the state water plan and later taking charge of water conservation work for the state. Before that he was employed as an engineer on San Francisco's Hetch Hetchy project.

● LESS THAN A MONTH after he was sworn in as a Federal Power Commissioner, MON C. WALLGREN was elected vice-chairman of the commission for the calendar year 1950. The ex-governor of Washington and former U. S. Senator succeeded Leland S. Olds on the commission in November, after a Senate committee earlier last year blocked President Truman's appointment of Wallgren to be chairman of the National Security and Resources Board. As vice-chairman of the commission, Wallgren serves under Chairman Nelson Lee Smith, independent ex-Republican, whose five-year term on FPC expires next June.

● APPOINTMENT of Loren J. Westhaver to the position of manager of operations of Geneva Steel Co. was announced recently by Dr. Walther Mathesius, president of this U. S. Steel subsidiary. Westhaver succeeds ROBERT G. GLASS, vice-president, who will become assistant to the president.

● FRANK COPITHORNE, control manager of B. C. Electric Co., Vancouver, for the past three years, has moved to Regina as comptroller for the Saskatchewan Power Corp.

● JAMES M. KEITH, Oakland resident, has been appointed representative of Westinghouse Electric Corp. associated with the Hawaiian Electric Co., Westinghouse agents for the territory. At Honolulu Keith succeeds R. J. COBBAN, who retired on Dec. 31 after more than 40 years with the firm.

Remi Bollaert, consulting and application engineer for Westinghouse Electric Corp., San Francisco, died Dec. 2. Born in Canada June 4, 1913, Mr. Bollaert became a U.S. citizen in 1930, was graduated from the University of California in 1936 with B.S. degree, and received his E.E. degree in 1937. He then entered the engineering student course at the East Pittsburgh Works of Westinghouse and was transferred to the district engineering department at Los Angeles in 1939. In 1942 he was transferred to the engineering department in San Francisco as a consulting and application engineer, where his work was principally on industrial applications of all types of electrical machinery, including motors, control and industrial electronics. He had invented numerous control schemes for crane and electronic applications. During World War II he was actively engaged in numerous applications directly connected with the activities of the armed forces. Mr. Bollaert was a member of the executive committee of the San Francisco Section of AIEE for 1948-49 and was elected secretary of the section for the 1949-50 term.

● HERBERT G. MCAFFERTY, 60, representative for the Joslyn Pacific Co., Los Angeles, died in Pasadena recently after a short illness. He was a member of the Los Angeles Electric Club, the American Institute of Electrical Engineers and the Pacific Coast Electrical Assn.

● E. R. SEAMAN, founder and former owner of the Oaks (Calif.) Light and Power Co., died recently following a heart attack. Mr. Seaman formed the small company in 1925 to serve seven customers; in the early days generated his power from a Stutz-Studebaker engine. In addition to running the company, he was electrical engineer for the city of Oakland for a number of years. He sold the light and power company to PG and E last January and had been living at his home in Lake County.

TRANSFORMER BARGAIN

OISC outdoor type, 60 cycle, single phase, G.E., West., Wagner, etc., CSP and conventional types. Steel and Cast Iron Tanks. Some new. 2400 Volt Primary 110/220 Volt Secondary.

120—1½ KVA
42—2 KVA
134—3 KVA

For amazingly low prices—
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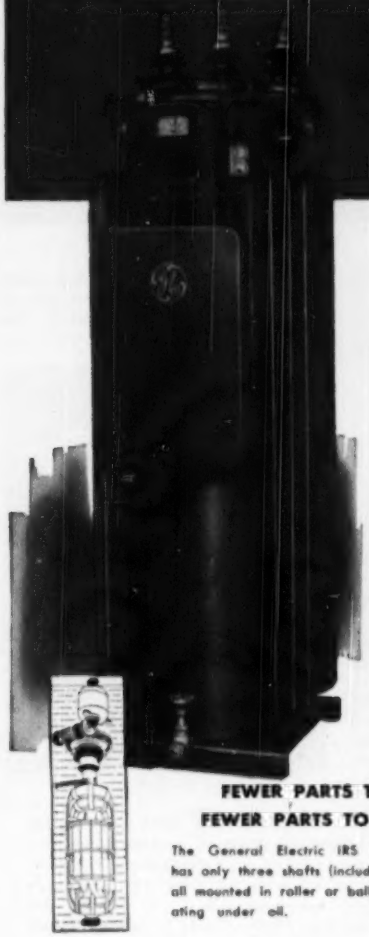
PRACTICALLY NOTHING TO MAINTAIN



...not even the Oil!

General Electric's present-day Induction-type Feeder Voltage Regulator comes as close to being maintenance-free as any electrical equipment with moving parts.

And—these regulators give accurate, stepless regulation, with no time-delay. They respond immediately to voltage changes and will provide correction at an average rate of one per cent in 1½ seconds throughout the entire range of ± 10 per cent regulation.

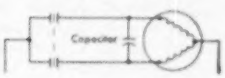
Bulletin GEA-2985C gives a full description of this induction regulator—of its basic design which has been standard for ten years, and of the refinements, particularly in control-panel arrangement, which have recently been incorporated at the suggestion of users. A copy is yours for the asking. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

FEWER PARTS TO WEAR
FEWER PARTS TO MAINTAIN

The General Electric IR5 Induction Regulator has only three shafts (including the motor) . . . all mounted in roller or ball bearings, all operating under oil.

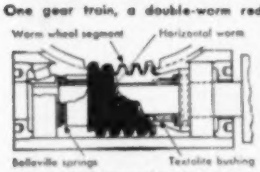
SIMPLE DYNAMIC BRAKING

The capacitor that gives the motor its high starting torque automatically provides strong braking action when the motor supply circuit is opened. No separate braking circuits are needed because the capacitor is permanently connected across the motor terminals. There are no mechanical devices to adjust.



NON-CHATTERING LONG-WEARING GEARS

One gear train, a double-worm reduction, provides a drive which is simple, silent, self-locking and positive. There are no ratchets, no pawls, no chains to introduce uncertain operation and questionable life.



Details of Spring-cushioned Worm

SEALED TANK PROLONGS OIL LIFE

Since there are no switching contacts in the IR5 regulator, designers were free to seal the tank completely. By doing this, they sealed out atmospheric air, moisture and other contaminants. The life of the insulating oil—and consequently the regulator—is greatly prolonged.

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

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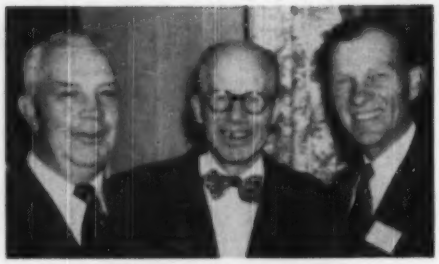


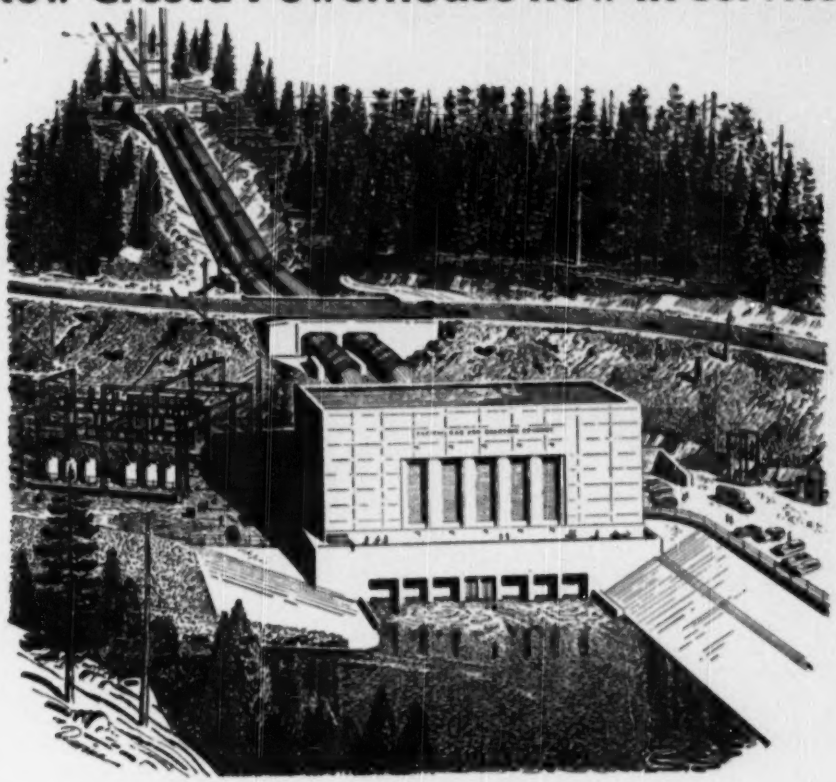
Utahans at Idaho Electrical Contractors meeting included E. E. Brazier, G-E Supply manager, who addressed convention; and visitors, W. A. Huckins, sales manager, Utah P&L Co. and Al Leick, former UP&L lighting man, now representing Joslyn Pacific Co. in Rocky Mountain territory

James M. Keith (above) has been appointed Westinghouse representative with Hawaiian Electric Co., Honolulu. He goes to Hawaii from Oakland, Cal.

Howard Lambert (below), apprentice lineman, California Electric Power, saved an infant's life by artificial respiration, after her apparent drowning

At formal dedication of Pacific Power & Light's 45,000-kw. generator at Merwin development: E. F. Pearson, assistant general manager; H. H. Schoolfield, former chief engineer, now engineering consultant; O. L. LeFever, former Northwestern Electric chief engineer, now consultant; D. J. Shore, Merwin plant superintendent; L. T. Merwin, for whom the plant is named; Paul B. McKee, Pacific Power & Light president

New Cresta Powerhouse now in service



Sixth major plant added to the P.G. and E. system in 18 months

Up on the Feather River, 30 miles east of Oroville, the massive new Cresta Powerhouse that has been a construction attraction for sightseers for many months, is now on the job pouring out electricity. Its completion set a record in power plant construction . . . it is the sixth new P. G. and E. power plant put into service during the last eighteen months. With the addition of Cresta's 101,000 horsepower—a total of 694,000 horsepower of new generating capacity has come on the line since V-J Day. Work is being rushed on additional plants which will add another 1,107,000 horsepower by mid-1951. The total horsepower from all of these new power plants will be 1,801,000. This is about 6 per cent of the total of new electric power facilities being built by all electric companies in the United States in the postwar period.

Kern Steam Plant, near Bakersfield, began turning out 101,000 horsepower for California in *May, 1948.*

Electra Powerhouse, on the Mokelumne River, produces 153,000 horsepower. It came on the line in *July, 1948.*

West Point Powerhouse, also on the Mokelumne River, added another 21,000 horsepower in *November, 1948.*

Station "P", the steam giant, by San Francisco Bay, added a big 298,000 new horsepower in *February, 1949.*

Colgate Powerhouse, on the Yuba River, started pouring out 40,200 horsepower for California in *June, 1949.*

P·G·and E· PACIFIC GAS AND ELECTRIC COMPANY

EW IX—180

One sign of a good customer!

These days, good appliance customers are getting harder and harder to recognize. One way to sort "prospects" from "suspects" is to concentrate on those with Certified Adequate Wiring in their homes. These owners get efficient service from every electrical appliance —and that paves the road to future sales with a surface of satisfaction that's easier to travel on.

Adequate Wiring means plenty of circuits, outlets and switches for present and anticipated electrical needs. It means a full measure of convenience, comfort and economy. And it means a minimum of trouble and expense on new appliance installation. It's important to the customer. It's important to every electrical appliance dealer, as well. From the dealer's point of view, the Adequate Wiring symbol says: "Adequate Wiring serves and saves—and *sells!*"

PACIFIC COAST ELECTRICAL ASSOCIATION

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